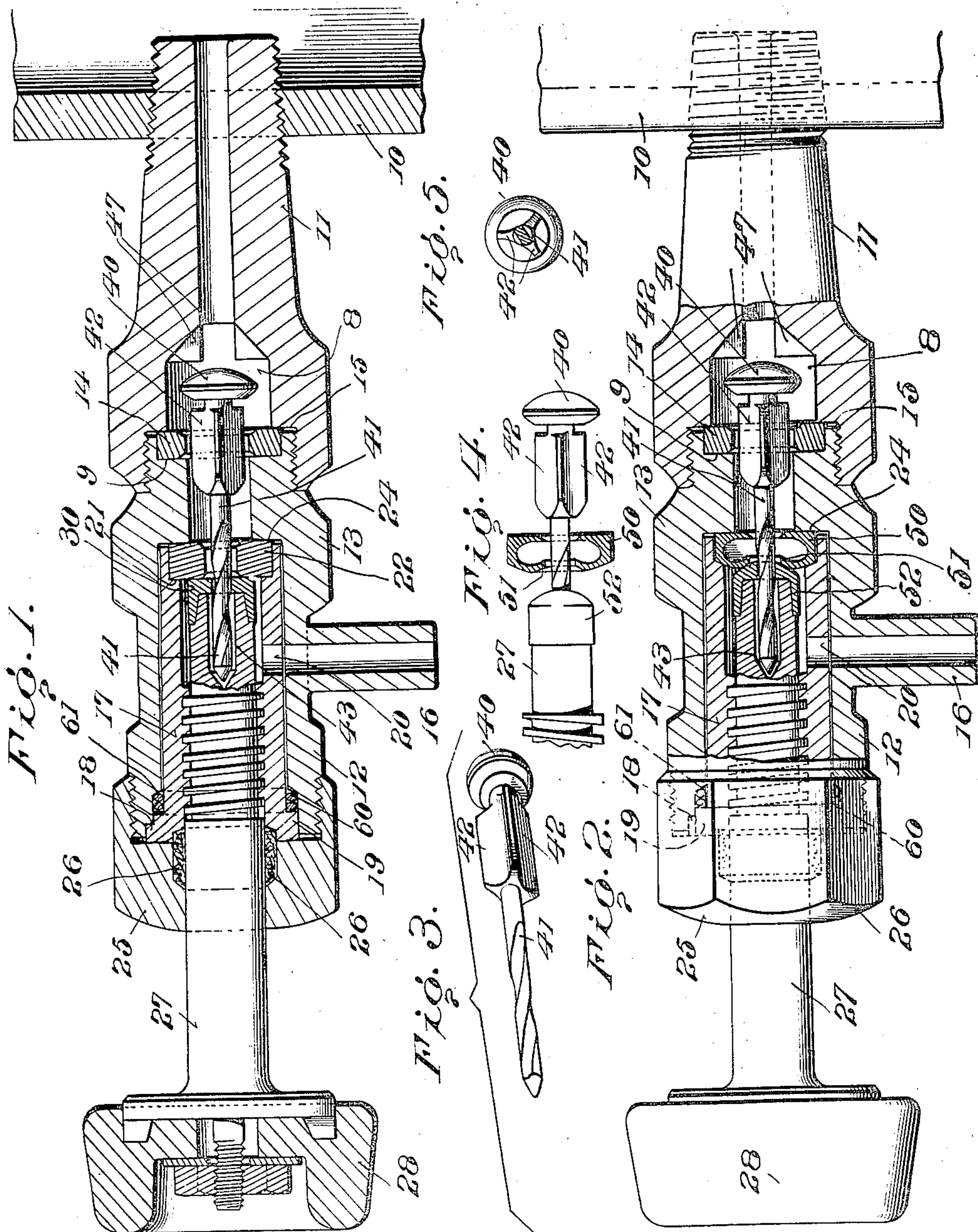


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A. P. PRENDERGAST.  
GAGE COCK.

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Inventor

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# UNITED STATES PATENT OFFICE.

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## GAGE-COCK.

No. 843,842.

Specification of Letters Patent.

Patented Feb. 12, 1907.

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*To all whom it may concern:*

Be it known that I, ALOIS P. PRENDERGAST, of Baltimore, Maryland, have invented a new and useful Improvement in Gage-Cocks, which improvement is fully set forth in the following specification.

My present invention relates to improvements in gage-cocks, and especially to such as are particularly designed for use on the boilers of railway-locomotives, where three such cocks tapped into the boiler at different heights are constantly used by the engineer to test or gage the height of the water in the boiler. As the fall of the water below a certain level would result in material injury to the boiler which may even be so serious as to endanger the lives of the train employees and passengers, it is of great importance that these gage-cocks shall at all times be in perfect operative condition to promptly indicate when opened whether or not the water is at or below the level of the cock opened. In the designs of gage-cocks now commonly used on locomotives frequent repairs are required to overcome leaks and otherwise guard against defective operation of the cocks when the locomotive is in use. Furthermore, the making of the most ordinary repairs necessitates blowing off the steam in the boiler before the cock or parts thereof can be removed and access obtained to the part or parts to be repaired or replaced. Aside from the time required in making repairs or in putting an entirely new gage-cock in place the time consumed in blowing off the steam and in subsequently refilling the boiler and again generating the required steam-pressure places the engine out of use for approximately three or four hours or even longer.

Among the principal objects of my invention is the provision of a gage-cock which will permit of all ordinary repairs without drawing off or lowering the steam-pressure of the boiler and without the aid of shop facilities or the work of skilled mechanics, from which it follows that such repairs can be readily made en route.

Another principal object is to so construct the cock that the parts may be readily and reliably assembled and that removable and readily-separable parts are provided at points where there is the greatest liability of injury and wear, thereby facilitating access to the part to be repaired and minimizing the expense of providing new parts.

These and other objects and advantages

attained by the invention will be more fully understood from the detailed explanation in connection with the accompanying drawings, illustrating preferred embodiments of the invention, and wherein—

Figure 1 is a longitudinal sectional view. Fig. 2 is a similar view of a slightly-different embodiment. Figs. 3 and 4 are views of details. Fig. 5 is a section of the try-valve stem. Fig. 6 is a face view of the detachable try-valve cap.

Referring first to Fig. 1, 10 is a part of the wall of a steam-boiler, and 11 is the boiler-section or spud of the gage-cock, which may remain permanently screwed into its opening in the wall of the boiler, as the other parts of the cock may be readily disconnected and removed from this spud.

12 is what may be termed the "valve-section" of the cock, having a part 13 in the form of a nut adapted to be engaged by a wrench to turn the valve-section in engaging its reduced screw-threaded end with an interior screw-thread in the outer end of spud 11. The inner end of valve-section 12 is counter-bored, forming an annular recess or seat 9 for a removable annular valve-seat 14, which by the screwing together of parts 11 and 12 is clamped tightly against the interior shoulder 15 of spud 11, as shown in Fig. 1.

16 is a drip-nozzle at one side of valve-section 12.

17 is a cylindrical sleeve for the try-valve stem, preferably tapering slightly toward its inner end, said sleeve fitting in the outer end of valve-section 12 and having an annular shoulder 19, compressing a packing 60 tightly against an opposing annular shoulder 61 in the valve-section. Sleeve 17 also has a lug or ear 18, engaging a notch in the end of the valve-section 12, preventing turning of the sleeve in said section and insuring registering of opening 20 through the wall of the sleeve with the opening of the drip-nozzle 16 when the sleeve is in place. At its inner end sleeve 17 is counterbored, forming an annular seat 21 for the removable annular valve-seat 22, projecting slightly beyond the end of the sleeve, so as to be tightly clamped against the interior shoulder 24 of the valve-section when the sleeve is clamped in place by the cap-nut 25 directly engaging the outer end of said sleeve. The cap-nut also acts to compress the packing 26 against the outer end of sleeve 17 and about valve-stem 27.

27 is the try-valve stem, having a screw-



thread engaging an interior screw-thread on the fixed sleeve 17. At its outer end the stem is provided with a turn-wheel 28. The inner end of the stem beyond the screw-threads is tapered and fits into the tapered opening of a cap 30, tightly driven onto said tapered end of the stem and constituting a removable try-valve cooperating with seat 22. The try-valve is so named because by its operation the engineer is enabled to try the height of the water in a boiler. The try-valve or cap 30 is preferably made of tempered steel or bronze, though any other suitable material may be employed.

40 is a shut-off or check valve located in a chamber 8 in the outer end of spud 11 and adapted to close all exit from the boiler through the gage-cock by seating against valve-seat 14. The stem 41 of this valve passes into the valve-section 12, through the annular seat 22, through the try-valve or cap 30, and into a socket 43 in the end of valve-stem 27. Wings 42 on the valve-stem hold the valve in operative position, preventing it from falling too far to one side or the other, at the same time leaving a central passage or passages through the cock for the exit of steam or water when the check-valve is open. The valve-stem 41 has two opposite flattened surfaces, (see Fig. 5,) which extend spirally around the stem longitudinal thereof, forming what may be termed a "spiral stem." The opening in cap 30, through which this stem loosely passes, is shaped with flattened sides, Fig. 6, to conform to the cross-section of the valve-stem, forming a connection which insures central alinement of the cut-off valve and causes said valve to partake of the rotary and longitudinal movements of the valve-stem 27 in the ordinary movements of opening and closing the try-valve, but permitting the valve-stems 27 and 41 to be readily disconnected in removing the try-valve, as hereinafter explained. Radiating slots or notches 47, cut in the shoulder formed at the intersection of the chamber 8 and the central opening through spud 11, provide passages around the check-valve if for any reason the latter becomes disconnected from the stem 27 of the try-valve or for other reason bears against said shoulder.

Fig. 1 shows the parts in position in which the try-valve 30 is closed by being tightly clamped against its seat and the check-valve is opened, being held quite a distance from its seat. To try the height of water in the boiler, the engineer operates wheel 28 until valve-stem 27 by its screw-threaded engagement with sleeve 17 separates try-valve 30 from its seat, (but not sufficient to permit check-valve 40 to engage its seat 14,) permitting water or steam to escape from the boiler through spud 11, past the check-valve 40, past try-valve 30, through opening 20, and out of drip-nozzle 16. The turning of the

valve-stem 27 and try-valve to thus open the latter also rotates the check-valve 40. Since the try-valve is frequently opened and closed while check-valve 40 is less frequently closed, the rotation and longitudinal movement of the check-valve 40 with each operation of the try-valve constantly maintains the check-valve in operative condition, prevents obstruction thereof by sediment, incrustation, scale, or other foreign matter, and thus insures proper operation when the valve is closed.

If it is found that the try-valve leaks when closed, (the position shown in Fig. 1,) the engineer, without interfering with the steam-pressure or water in the boiler, after rotating turn-wheel 28 to fully open the try-valve (as indicated by the flow of steam or water from the drip-nozzle) continues the rotation of said turn-wheel until the check-valve 40 engages its seat, closing the passage from the boiler, (as indicated by cessation of flow of steam or water from the drip-nozzle.) Cap-nut 25 is then loosened, and by a longitudinal pull on the turn-wheel 28, the valve-stem 27, and try-valve 30 the sleeve 17, still connected to stem 27 by the screw-threads, and the valve-seat 22 are all withdrawn together from the valve-section 12 of the cock, the valve-stems 27 and 41 being by this movement completely disconnected. The pull upon the connection between the valve-stems 27 and 41, either in closing the check-valve before the cap-nut is loosened or in withdrawing the parts after said nut is loosened, draws or pulls check-valve 40 firmly against its seat, thus insuring seating of this valve, particularly in the absence of steam-pressure within the boiler, and when the cock is mounted in such position that said valve tends to gravitate away from its seat. The principal operating parts being thus withdrawn from the parts of the cock which remain attached to the boiler and prevent the escape of the water or steam therein, the defective part (usually the valve-seat 22 or the cap 30) may be separated from the other parts and repaired or replaced. This may be readily accomplished without the aid of shop facilities or a skilled mechanic. In replacing the parts the opening in the valve or cap 30 and the spiral valve-stem 46 will reengage. As apparent, repairs such as above explained may be easily and quickly made wherever the locomotive may happen to be and without interfering with the use thereof.

As the check-valve is constantly off its seat in all ordinary positions of the try-valve and by reason of the length of its valve-stem 41 can only close against its seat when the try-valve has been opened to an extraordinary degree, as in removing the try-valve, there is little wear upon this check-valve or its seat, and the liability of leakage at this point is remote; but should it become necessary to re-



pair or replace the parts of this valve access may be readily had thereto by unscrewing the valve-section 12 of the cock from the spud 11.

5 The formation and arrangement of the parts as above explained is such that the removable try-valve seat and the removable check-valve seat may be made of different materials and of different shapes best adapted to the materials selected. I prefer to so  
10 form these seats that they may be reversed and to make them of brass or other suitable material adapted to resist the wear of the try-valve. In place of seat 22 of Fig. 1 I may,  
15 for example, employ the yielding or flexible seat 50, (shown in Figs. 2 and 4,) the inturned flange 51 of which is adapted to be engaged by the try-valve cap 52 and slightly yield under the pressure thereof to form tight contact  
20 with the surface of said valve. In this form seat 50 is preferably made of steel, the surface of its flange 51, which contacts with the valve, being faced with brass or bronze.

I have herein described and illustrated preferred embodiments; but it will be apparent that the invention is capable of many other  
25 embodiments, which it is not necessary to show herein.

What I claim is—

30 1. In a gage-cock, the combination with the casing, of a valve and a seat therefor both within the casing; a stem for said valve; a sleeve removably fitting in the casing about the valve-stem and having screw-thread  
35 engagement with the latter, said sleeve being inclosed by the casing and held against rotation therein; and means removably holding the sleeve in the casing.

2. In a gage-cock, the combination with  
40 the casing, of a valve-seat therein; a valve-stem; a detachable valve on the stem adapted to cooperate with said valve-seat; a sleeve removably fitting in the casing about the valve-stem and having screw-thread engagement  
45 with the latter, said sleeve being inclosed by the casing and held against rotation therein; and means removably holding the sleeve in the casing.

3. In a gage-cock, the combination with  
50 the casing, of a valve and a valve-stem therefor; a sleeve removably fitting in the casing about the valve-stem and having screw-thread engagement therewith, said sleeve being inclosed by the casing and held against  
55 rotation therein; a separate valve-seat for the valve removably held in place by the sleeve; and means removably holding the sleeve in the casing.

4. In a gage-cock, the combination with  
60 the casing, of a valve and a valve-stem therefor; a separate removable seat for the valve; a sleeve removably fitting in the casing around the valve-stem and in screw-thread engagement with the latter, said sleeve being  
65 held against rotation in the casing and at its

inner end engaging the valve-seat and securing it in place against an interior shoulder on the casing; and a cap-nut at the outer end of the casing about the valve-stem removably securing the sleeve within the casing.

5. In a gage-cock, the combination with  
70 the casing, of a valve and a valve-stem therefor; a sleeve removably fitting in the casing around and in screw-thread engagement with the valve-stem, said sleeve being held against  
75 rotation in the casing; a separate removable seat for the valve fitting in a counterbored seat at the inner end of the sleeve and held by the latter against an interior shoulder on the casing; and a cap-nut screw-threaded onto  
80 the end of the casing and removably securing the sleeve within the casing.

6. In a gage-cock, the combination with the casing, of a valve and a valve-stem therefor; a separate removable seat for the valve;  
85 a sleeve removably fitting in the casing around the valve-stem and in screw-thread engagement with the latter, the inner end of said sleeve engaging the valve-seat and securing it in place against an interior shoulder  
90 on the casing; a projecting lug on the sleeve engaging a notch in the casing when the sleeve is properly positioned in the latter; and a cap-nut screw-threaded onto the end of the casing and removably holding the  
95 sleeve in the casing.

7. In a gage-cock, the combination with a casing comprising two separably-connected parts, of a try-valve and a seat therefor within the outer part of the casing; a check-valve;  
100 and a removable seat for the check-valve independent of and apart from the try-valve seat, and held in place at the joint between said parts of the casing, and released upon detachment of said parts.

8. In a gage-cock, the combination with a casing comprising a spud and a valve-section, of a try-valve in the valve-section and means for opening and closing the same against a  
105 seat in said valve-section; a check-valve removable upon detaching the valve-section from the spud; and a seat for the check-valve secured between the spud and valve-section at the joint thereof and removable upon dis-  
110 connection of said parts, said check-valve seat being independent of and apart from the try-valve seat.

9. The combination with a casing, of a try-valve mounted in the casing, and means for operating the same; a check-valve; and a  
120 connection between said valves holding the check-valve open in all ordinary positions of the try-valve and adapted to pull the check-valve to its closed position when the try-valve is opened to an extraordinary degree.

10. The combination with a casing, of a try-valve removably mounted in the casing, and means for operating the same; a check-  
125 valve; and a connection between said valves holding the check-valve open in all ordinary  
130



positions of the try-valve and adapted, upon opening of the try-valve to an extraordinary degree and removal of said try-valve from the casing, to first pull the check-valve to its closed position and then become disengaged to free the try-valve.

11. The combination with a casing, of a try-valve removably mounted in the casing; means for operating said try-valve including a valve-stem; a check-valve and stem therefor within the casing; and a connection between said valves including the stem of the check-valve engaging a socket in the inner end of the try-valve stem, said connection being adapted, upon opening of the try-valve to an extraordinary degree and removal of said valve from the casing, to first pull the check-valve to its closed position and then permit disengagement of the valve-stems to free the try-valve.

12. The combination with a casing, of a try-valve removably mounted in the casing and a stem for operating said valve; a check-valve; a flat-sided spiral stem therefor passing through a flat-sided opening in the try-valve, thereby forming a connection between said valve-stems transmitting to a check-valve ordinary movements of the try-valve, but permitting disconnection of the valve-stems upon withdrawal of the try-valve and its stem from the casing.

13. In a gage-cock, the combination with the casing, of a try-valve and a valve-stem therefor; a sleeve removably fitting in the casing around and in screw-thread engagement with the valve-stem, said sleeve being held against rotation in the casing; a removable seat for the try-valve held by the inner end of the sleeve against an interior shoulder on the casing; a cap-nut screw-threaded onto

the outer end of the casing and removably securing the sleeve within the casing; a check-valve and seat therefor; and a flat-sided spiral on the check-valve stem passing through a flat-sided opening in the try-valve into a socket in the try-valve stem.

14. In a gage-cock, the combination with the casing, consisting of a spud and a valve-section, of a try-valve and a valve-stem therefor; a sleeve removably fitting in the valve-section around and in screw-thread engagement with the valve-stem, said sleeve being held against rotation in the casing; a removable seat for the try-valve held by the inner end of the sleeve against an interior shoulder on the valve-section; a cap-nut screw-threaded onto the outer end of the valve-section and removably securing the sleeve therein; a check-valve in a chamber in the outer end of the spud; a seat for the check-valve secured between opposing shoulders on the spud and valve-section at the joint thereof; and a flat-sided spiral stem on the check-valve passing through a flat-sided opening in the try-valve into a socket in the try-valve stem.

15. The combination with a casing, of a try-valve and means for operating the same; a seat for said valve removably mounted in the casing, said seat consisting of an annulus or ring having an inwardly-projecting annular yielding flange with which the valve is adapted to engage.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALOIS P. PRENDERGAST.

Witnesses:

JOHN J. FALMERSON,  
RALPH V. LEWIS.