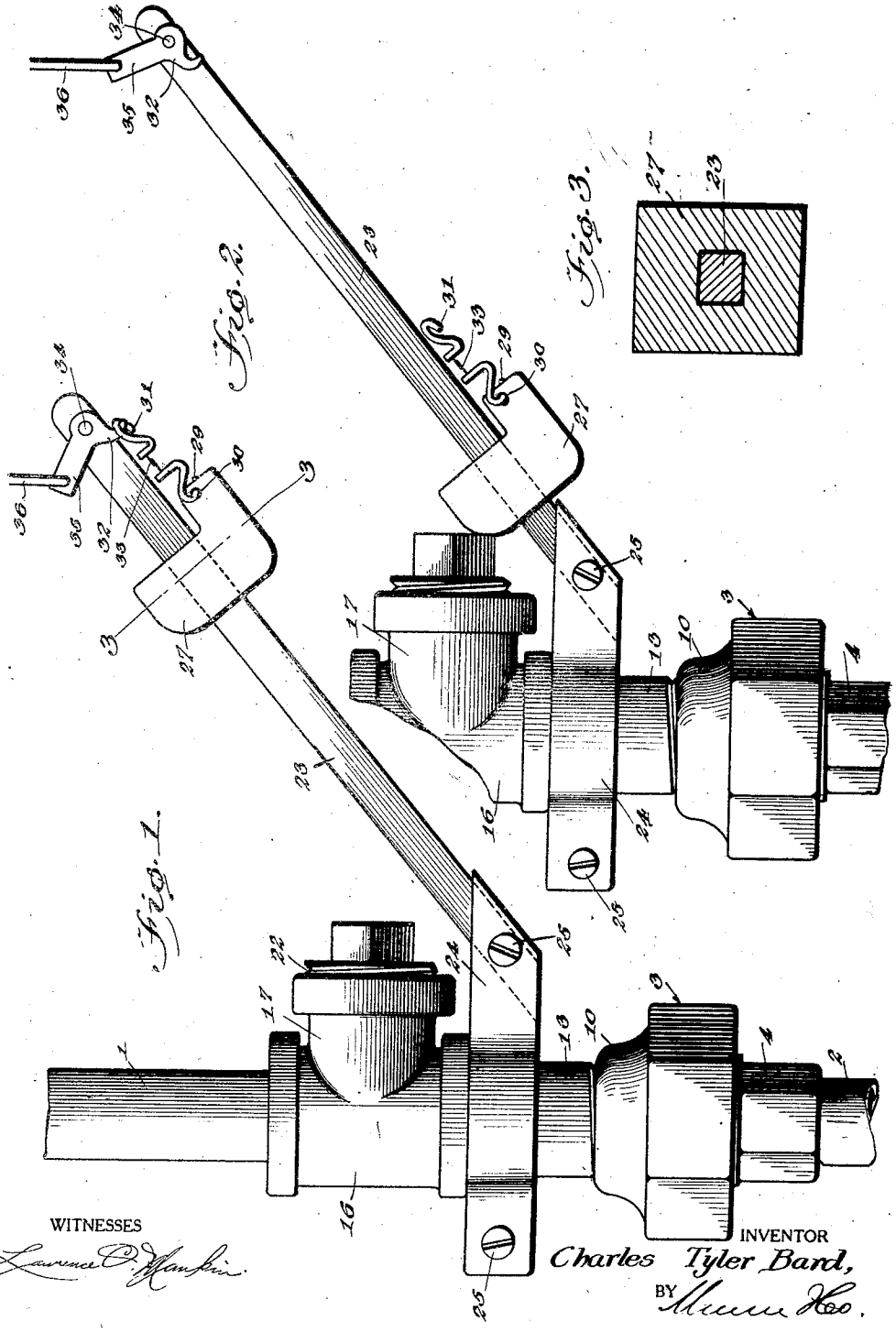
April 13, 1926. 1,580,277

C. T. BARD

FLUID CUT-OFF MECHANISM

Filed June 25, 1925 2 Sheets-Sheet 1



WITNESSES

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Fig. 5.

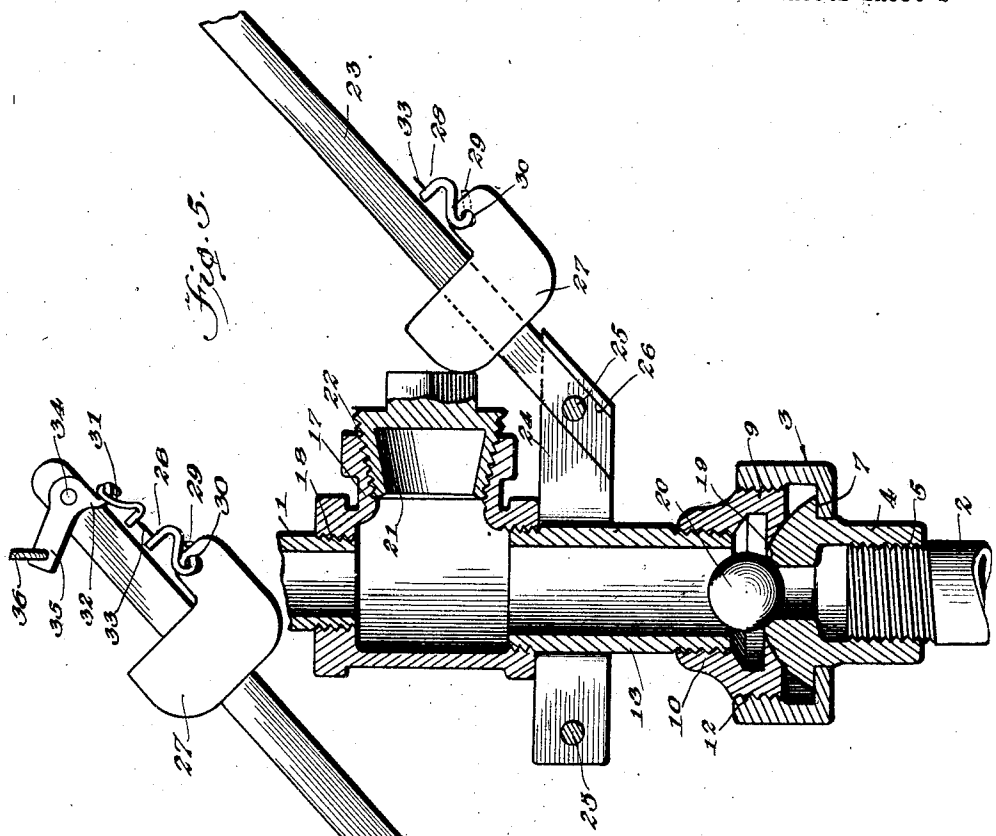
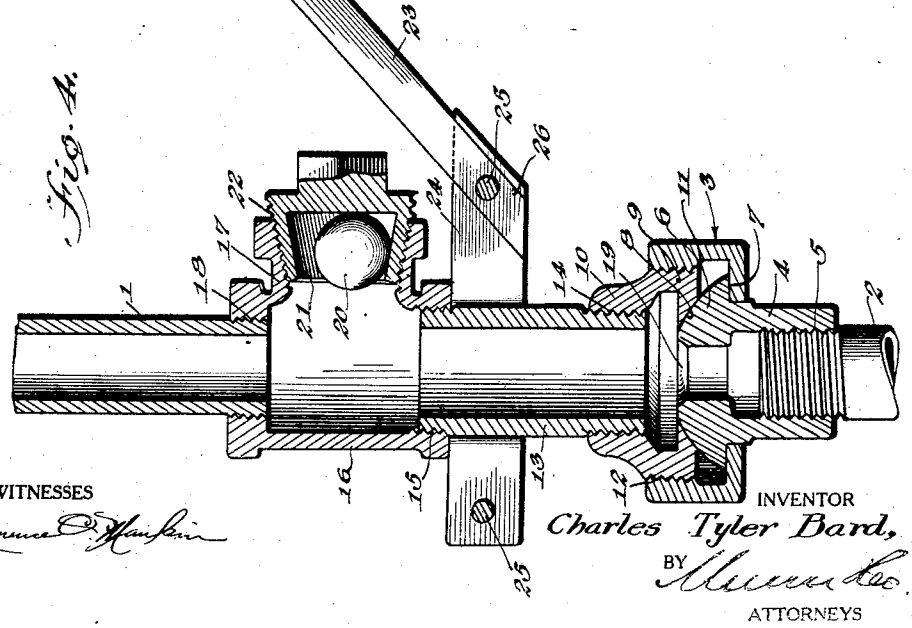


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES TYLER BARD, OF NORWICH, CONNECTICUT.

FLUID-CUT-OFF MECHANISM.

Application filed June 25, 1925. Serial No. 39,578.

To all whom it may concern:

Be it known that I, CHARLES T. BARD, a citizen of the United States, and resident of Norwich, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Fluid-Cut-Off Mechanism, of which the following is a specification.

My invention relates to improvements in fluid cut-off mechanisms, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of the invention is the provision of a fluid cut-off mechanism which is adapted to act automatically to cut off the flow of gas or other fluid through a conduit when an abnormally high temperature has been reached in the place in which the mechanism is disposed, as in the case of fire, the mechanism also being adapted to be actuated manually when desired by a person who is located at a considerable distance from the cut-off mechanism to effect the shutting off of flow of gas or other fluid through the conduit which is equipped with the improved cut-off mechanism.

Another object of the invention is the provision of a cut-off mechanism of the character described having a member for cutting off flow through a conduit completely housed within a portion of the conduit and normally out of position to prevent or in any way retard flow through the conduit together with operating means outside of the conduit and operable to cause movement of the fluid cut-off member from inoperative position to position to effectually close the conduit against the passage of fluid therethrough.

A further object of the invention is the provision of a fluid cut-off mechanism of the character described which can be reset quickly, easily and conveniently to again be ineffective to prevent flow of fluid through the conduit with which the mechanism is associated, after the fluid cut-off mechanism has been actuated to cause movement of the cut-off member to position to prevent flow of fluid through the conduit.

A still further object of the invention is the provision of a fluid cut-off mechanism of the character described which can be manufactured and installed at a relatively low cost, is not likely to get out of order easily, and is thoroughly practical commercially.

Other objects and advantages of the invention will be apparent from the following description, considered in conjunction with the accompanying drawing, in which—

Figure 1 is a side elevation of a fragmentary portion of a conduit for fluid equipped with a fluid cut-off mechanism embodying the invention, showing the position of the parts of the operating means of the device when a movable actuating member of the operating means is in set position,

Figure 2 is a view similar to Figure 1, showing the position of the movable actuating member of the operating means of the device when said actuating member has reached the end of its operating stroke after having been released as a result of manual actuation of the operating means,

Figure 3 is a section substantially along the line 3—3 of Figure 1,

Figure 4 is a longitudinal vertical section through the portion of the conduit which is exhibited in Figure 1, showing the fluid cut-off member or valve supported in inoperative position or away from its seat, and

Figure 5 is a view similar to Figure 4, showing the fluid cut-off member or valve in operative position or in other words in position on its seat to prevent flow through the conduit, the movable actuating member of the operating means of the device being shown at the end of its operating stroke after it has been released as a result of the operating means of the device having been heated to an abnormal degree.

A fragmentary portion of a conduit for fluid which may be equipped with the invention is shown in Figures 1, 2, 4 and 5 of the drawing and may include vertically spaced axially aligned tubular sections or lengths of pipe 1 and 2 respectively as shown in Figures 1, 4 and 5. A pipe union generally indicated at 3 comprises a coupling member 4 having the lower end portion thereof in threaded engagement, as at 5, with the upper end portion of the tubular

section 2 of the conduit. The upper end portion of the coupling member 4 is designated 6 and is enlarged externally, thus producing a downwardly facing shoulder at 7. The upper face of the enlarged upper end portion 6 of the coupling member 4 is convexly curved and is adapted to contact closely with a concavely curved seat 8 in the internally enlarged lower end portion 9 of a tubular coupling member 10 which also is comprised in the union, the convexly curved contact surface of the coupling member 4 being ground in its seat 8 to assure a fluid tight fit between the coupling members 4 and 10 when the contact surface of the coupling member 4 is held against its seat. This can be accomplished by means of a coupling nut 11 which is comprised in the union and which includes an upper end portion in threaded engagement at 12 with the coupling member 10 and having an inwardly extending flange at its lower end in engagement with the shoulder 7 of the coupling member 4.

A nipple 13 has the lower end portion thereof in threaded engagement at 14 with the upper end portion of the coupling member 10 while the upper end portion of the nipple is in threaded engagement at 15 with the lower end portion of a pipe fitting 16 having a lateral tubular branch 17 and also having an upper end portion in threaded engagement at 18 with the lower end portion of the tubular section 1 of the conduit. In other words, the fitting 16 may be an ordinary T.

The upper end portion 6 of the lower coupling member 4 of the union also is enlarged internally and the bore thereof is enlarged slightly adjacent to its upper end, as indicated at 19. This enlarged upper end portion 19 of the bore of the coupling member 4 has the wall thereof curved concavely longitudinally thereof to conform to the curvature of a ball-valve 20. The ball-valve 20 normally is retained in an outwardly enlarging cavity or pocket 21 in a plug 22 which is threaded into the lateral branch 17 of the fitting 16. The plug 22 is shown as tapering externally toward its inner end and the inner wall of the lateral branch 17 therefore is shown as enlarging toward its outer end although it is obvious that the outer wall of the plug 22 may be uniform in diameter and the bore of the lateral branch 17 likewise uniform in diameter, as in the case of a standard pipe T, only the pocket within the plug being enlarged toward its outer end.

The operating means that the invention provides includes an inclined supporting bar 23 having the lower end portion thereof secured between extending end portions of the cooperative members 24 of a clamp which embraces the nipple 13 and is held against displacement from a desirable position on the nipple 13 by means of fastening devices, such as the screws 25 which connect corresponding end portions of the clamp members 24. One of the clamp members 24 is provided with an inclined channel 26 in its inner face into which a side portion of the bar 23 extends when the lower end portion of the bar 23 is secured between adjacent end portions of the clamp member 24, as when the screws 25 are tightened, one of the screws 25 preferably extending through an opening in the lower end portion of the supporting bar 23. The supporting bar 23 is adapted to be held substantially rigid with the clamp members 24.

An actuating member which is comprised in the operating means has the form of a block 27 of considerable weight. This block is slidable on the inclined supporting bar 23 and is adapted to strike the outer end of the plug 22 when the block 27 slides down the bar 23 from the position shown in Figures 1 and 4 to the position shown in Figs. 2 and 5. This block or striker member normally is retained on the bar 23 adjacent to the upper end of the latter by means of a link 28 having an attaching member 29 at its lower end engaged with a transverse opening or eye 30 in an extending upper end portion of the block 27 and having an attaching element 31 at its upper end adapted to be slipped over the end of the bill of the hook 32. The attaching elements 29 and 31 of the link 28 are connected by a fusible member 33. The hook 32 is supported on a horizontal pivot element 34 which extends laterally of the upper end portion of the supporting bar 23 and has an integral handle 35. A pull rod or cable 36 is connected to the outer end of the handle 35 and may lead to any desirable place.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. Normally the ball valve 20 will be supported within the pocket 21 out of position to retard or prevent flow of fluid through the conduit which is equipped with the invention. The actuating member 27 normally is maintained adjacent to the upper end of the inclined supporting bar 23 by means of the link 28 and the hook 32, it being noted that the form of the hook 32 is such that it may be disposed substantially in line with the link 28 without the attaching element 31 slipping from the end of the bill of the hook. In the event that fire should occur in proximity to the link 28, fusion of the member 33 of the link will take place when that member has been unduly heated, and the actuating member 27 will slide by gravity downward on the supporting bar 23 and will strike the outer end of the plug 22. The impact of the striker member 27

against the plug 22 will jar the ball valve 20 from position in the pocket 21 and the ball valve will fall by gravity through the nipple 13 onto its seat 19, thus cutting off flow of fluid in a downward direction in the conduit past the union 3. In order to reset the device, it only is necessary to disconnect the coupling members of the union 3 from each other and to pull the pipes 1 and 2 apart a distance sufficient to spread the coupling members 4 and 10 so that the ball valve 20 then can be removed from the seat 19. Of course, it will be understood that the usual service cock, not shown, which in actual practice will be provided in the conduit above the T 16 will be closed before the coupling members of the union are disconnected. The plug 22 then is removed and the ball valve is placed in the pocket in the plug and the plug is replaced in the lateral branch of the T. The coupling members of the union are connected to each other in the usual manner and the slidable striker member 27 is returned to position on the supporting bar 23 adjacent to the upper end of the latter and is retained in position by means of a new link 28. In the event that it is desired to operate the device manually, a pull in a generally upward direction is exerted on the handle 35 for the hook 32 and the latter then will swing to position to release the link 28. The striker member 27 will slide by gravity down the supporting bar 23 and the impact of the striker member against the plug 22 will cause the ball valve 20 to be jarred from the pocket in the plug and to fall to position to cooperate with the seat 19 to close the conduit in the manner hereinbefore described.

It will be understood that the parts of the conduit may vary considerably in details of construction from those exhibited in the drawings without departing from the spirit and scope of the invention and that the parts of the device may be made of any suitable material or materials. It also is obvious that many modifications and adaptations of the form of the device illustrated in the drawing and described in the specification may be provided without departing from the spirit and scope of the invention and I therefore consider as my own all such modifications and adaptations thereof as fairly fall within the scope of the appended claims.

I claim:—

1. A fluid cut-off mechanism comprising a tubular conduit including a pipe union having a valve seat, a valve adapted to cooperate with said seat to close said conduit, and means for releasably holding said valve away from its seat and for permitting movement of said valve to position on its seat when said valve supporting means has been actuated by impact from outside of the conduit.

2. A fluid cut-off mechanism comprising a tubular conduit having a valve seat, a valve adapted to cooperate with said seat to close said conduit, means for releasably holding said valve away from its seat and for permitting movement of said valve to position on its seat when said valve holding means has been actuated, means associated with said conduit and operable to strike said conduit and thereby to jar said valve from said valve supporting means to position on said valve seat.

3. A fluid cut-off mechanism comprising a tubular conduit having a valve seat, a valve adapted to cooperate with said seat to close said conduit, means for releasably holding said valve away from its seat and for permitting movement of said valve to position on its seat when said valve holding means has been actuated, means associated with said conduit and operable to strike said conduit and thereby to jar said valve from said valve supporting means to position on said valve seat, means for releasably holding said striker means away from said conduit, said means for holding the striker means including a fusible element.

4. A fluid cut-off mechanism comprising a tubular conduit having a valve seat, a valve adapted to cooperate with said seat to close said conduit, means for releasably holding said valve away from its seat and for permitting movement of said valve to position on its seat when said valve holding means has been actuated, means associated with said conduit and operable to strike said conduit and thereby to jar said valve from said valve supporting means to position on said valve seat, means for releasably holding said striker means away from said conduit, said means for holding said striker means away from said conduit being adapted to be actuated manually to release said striker means.

5. A fluid cut-off mechanism comprising a tubular conduit having an internal valve seat, a valve disposed completely in the conduit and movable in the conduit to and from position to cooperate with said valve seat to close said conduit, means for releasably holding said valve away from its seat and in position to move when released against its seat, said valve holding means being adapted to be actuated as the result of a blow delivered thereagainst to release said valve for movement to position against said valve seat.

6. A fluid cut-off mechanism comprising a tubular conduit having an internal valve seat, a valve disposed completely in the conduit and movable in the conduit to and from position to cooperate with said valve seat to

close said conduit, means for releasably holding said valve away from its seat and in position to move when released against its seat, said valve holding means being adapted to be actuated as the result of a blow delivered thereagainst to release said valve for movement to position against said valve seat, and a striker member supported adjacent to said conduit for movement to and from position to deliver said blow to said conduit.

7. A fluid cut-off mechanism comprising a tubular conduit having an internal valve seat, a valve disposed completely in the conduit and movable in the conduit to and from position to cooperate with said valve seat to close said conduit, means for releasably holding said valve away from its seat and in position to move when released against its seat, said valve holding means being adapted to be actuated as the result of a blow delivered thereagainst to release said valve for movement to position against said valve seat, a striker member supported adjacent to said conduit for movement to and from position to deliver said blow to said conduit, and means releasably holding said striker member away from said conduit, said striker member holding means comprising a pivoted hook and a link attached to said striker member and engageable with said hook, said link including a fusible section intermediate the ends thereof.

8. A fluid cut-off mechanism comprising a vertically disposed tubular conduit, said conduit including a union consisting of a pair of cooperative coupling members having the contacting surfaces thereof ground to closely contact each other and a coupling nut connecting the coupling members and holding the contact surfaces of the coupling members against each other, the lower of said coupling members being formed internally to provide a seat for a ball valve at the upper end of said lower coupling member, said conduit including a tubular fitting located above the level of said union and having a lateral branch, a ball valve adapted to move in said conduit from the level of said lateral branch to position to cooperate with said valve seat to close said conduit, and means closing said lateral branch of said tubular fitting and having a pocket formed therein for loosely holding said ball valve out of the main passage of said conduit, and above the level of said valve seat.

9. A fluid cut-off mechanism comprising a vertically disposed tubular conduit, said conduit including a union consisting of a pair of cooperative coupling members having the contacting surfaces thereof ground to closely contact each other and a coupling nut connecting the coupling members and holding the contact surfaces of the coupling members against each other, the lower of said coupling members being formed internally to provide a seat for a ball valve at the upper end of said lower coupling member, said conduit including a tubular fitting located above the level of said union and having a lateral branch, a ball valve adapted to move in said conduit from the level of said lateral branch to position to cooperate with said valve seat to close said conduit, and a removable plug for closing said lateral branch of the tubular fitting, said plug having a pocket in its inner end for loosely receiving said ball valve to hold said ball valve out of the main passage of the conduit and above the level of said valve seat, the bottom wall of said pocket in the plug being inclined downwardly toward its outer end.

10. A fluid cut-off mechanism comprising a vertically disposed tubular conduit, said conduit including a union consisting of a pair of cooperative coupling members having the contacting surfaces thereof ground to closely contact each other and a coupling nut connecting the coupling members and holding the contact surfaces of the coupling members against each other, the lower of said coupling members being formed internally to provide a seat for a ball valve at the upper end of said lower coupling member, said conduit including a tubular fitting located above the level of said union and having a lateral branch, a ball valve adapted to move in said conduit from the level of said lateral branch to position to cooperate with said valve seat to close said conduit, and a removable plug for closing said lateral branch of the tubular fitting, said plug having a pocket in its inner end for loosely receiving said ball valve to hold said ball valve out of the main passage of the conduit and above the level of said valve seat, a supporting bar, means releasably engageable with said conduit below said tubular fitting for supporting said supporting bar in inclined position with the lower end thereof adjacent to the outer end of said plug, a striker member slidable on said supporting bar from a higher level to position to strike the outer end of said plug and thereby to jar said ball valve from the pocket in said plug into the main passage of the conduit.

11. A fluid cut-off mechanism comprising a vertically disposed tubular conduit, said conduit including a union consisting of a pair of cooperative coupling members having the contacting surfaces thereof ground to closely contact each other and a coupling nut connecting the coupling members and holding the contact surfaces of the coupling members against each other, the lower of said coupling members being formed internally to provide a seat for a ball valve at the upper end of said lower coupling member, said conduit including a tubular fitting located above the level of said union and having a lateral branch, a ball valve adapted

to move in said conduit from the level of said lateral branch to position to cooperate with said valve seat to close said conduit, a removable plug for closing said lateral branch of the tubular fitting, said plug having a pocket in its inner end for loosely receiving said ball valve to hold said ball valve out of the main passage of the conduit and above the level of said valve seat, a supporting bar, means releasably engageable with said conduit below said tubular fitting for supporting said supporting bar in the inclined position with the lower end thereof adjacent to the outer end of said plug, a striker member slidable on said supporting bar from a higher level to position to strike the end of said plug and thereby to jar said ball valve from the pocket in said plug into the main passage of said conduit, and means including a fusible element for releasably holding said striker member on said supporting bar above the level of said plug.

12. A fluid cut-off mechanism comprising a conduit having an internal valve seat, a valve loosely disposed in the conduit and adapted to cooperate with said valve seat to close said conduit, means for restraining said valve against movement from a position in which the valve is disposed off its seat, and means including a readily fusible element and disposed outside of said conduit for actuating said valve restraining means to release said valve for movement toward its seat.

13. A fluid cut-off mechanism comprising a conduit, a valve loosely disposed in the conduit and normally restrained against movement from a position to permit flow through the conduit to position to close said conduit, and means outside of said conduit and responsive to a given increase of temperature to cause movement of said valve from flow-permitting position to position to close said conduit.

14. In a fluid cut-off mechanism, a conduit having a lateral pocket and a valve seat located below the level of said pocket, and a valve loosely disposed in said pocket and adapted to be jarred from said pocket onto said valve seat.

15. In a fluid cut-off mechanism, a conduit having a lateral pocket and having a valve seat located below the level of said pocket, the bottom part of the inner wall of said pocket sloping toward its outer end, and a valve loosely disposed in said pocket, said valve being adapted to be jarred from said pocket onto said valve seat.

16. In a fluid cut-off mechanism, a normally open valved conduit adapted to be closed by the valve as the result of the impact of a blow against said conduit and means outside of said conduit and operable in response to an unduly high temperature to deliver said blow.

17. A fluid cut-off mechanism comprising a conduit including a pipe union having an internal valve seat, a valve normally held off said seat, and means responsive to undue temperature change to cause said valve to move to position against said seat, said union comprising members separable from one another to permit a re-setting of said valve in its normal position.

18. A mechanism substantially as described comprising a valve seat, a support adapted to normally maintain a valve off said seat, and impact means for jarring the valve from said support to permit the valve to pass to its seat.

19. In a mechanism substantially as described, a valve holder adapted to hold a valve and to permit the valve to be displaced, a jarring means movable against said holder to displace the valve by impact, and temperature responsive means for restraining said jarring means, said temperature responsive means being adapted to release said jarring means when heated to a given temperature.

20. In a mechanism of the character described, a valve adapted to close by gravity, means for releasably supporting said valve off its seat, and means whereby said valve supporting means can be jarred to release said valve from said supporting means.

21. In a mechanism of the character described, a means for supporting a valve so that the valve can be jarred from said supporting means against a valve seat, an impact member movable against said valve supporting means to displace said valve and means for restraining said impact member from moving against said valve supporting means, said restraining means being adapted to be actuated manually to release said impact member.

22. In a mechanism of the character described, a means for supporting a valve so that the valve can be jarred from said supporting means against a valve seat, an impact member movable against said valve supporting means to displace said valve and means for restraining said impact member from moving against said valve supporting means, said restraining means being adapted to be actuated manually to release said impact member, and also including an element adapted when heated to a given temperature to release said impact member.

23. In a mechanism of the character described, a means for supporting a valve so that the valve can be jarred from said supporting means against a valve seat, an inclined bar carried by said valve supporting means, a striker member adapted to slide on said bar against said valve supporting means to displace the valve by impact, and means including a readily fusible element connecting said striker member and said

bar to restrain said striker member from sliding on the bar against said valve supporting means.

24. A valve mechanism comprising a valve holder, a valve therein, and means adapted to act by impact against the holder to effect by jarring an operating movement of said valve.

25. In a mechanism substantially as described, a valve seat, a valve, a support on which the valve loosely rests and from which the valve may be jarred or displaced by the impact of a blow against the support, and means for delivering the blow to displace the valve from said support.

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