O. J. McGOWAN.

VALVE.

APPLICATION FILED OCT. 30, 1915.

1,193,577.

Patented Aug. 8, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

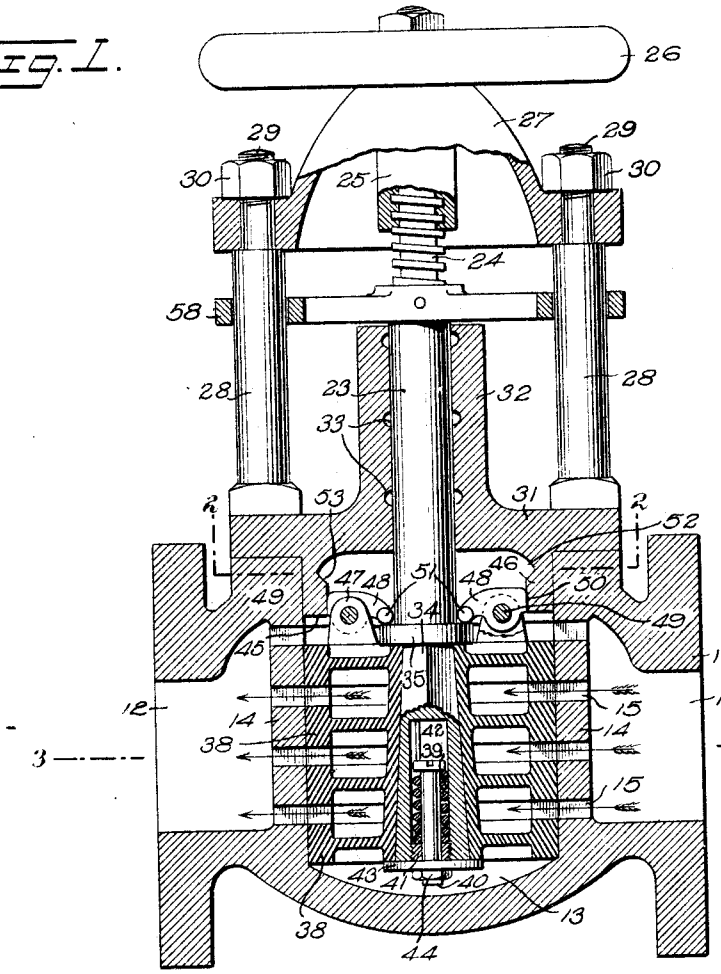
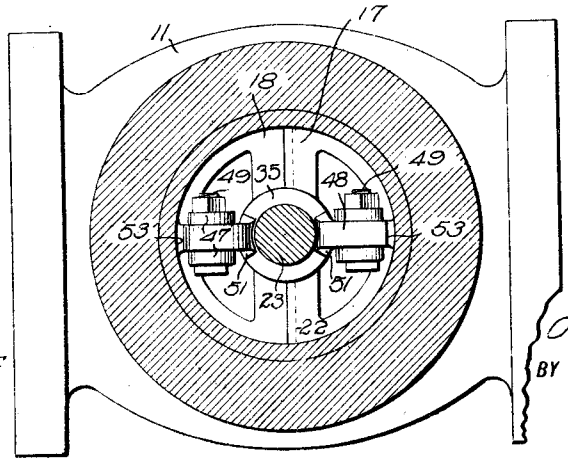


Fig. 2.



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2 SHEETS—SHEET 2.

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Fig. 3.

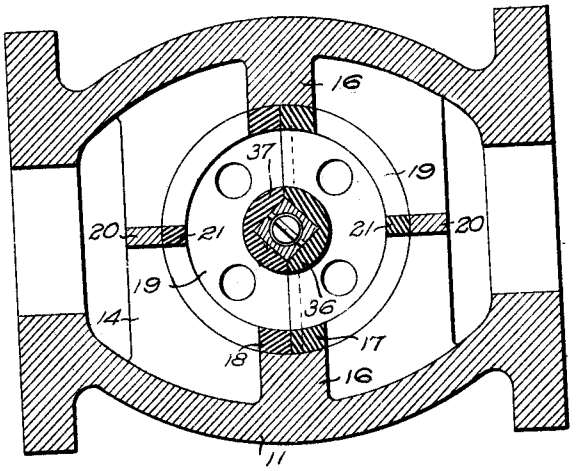


Fig. 4.

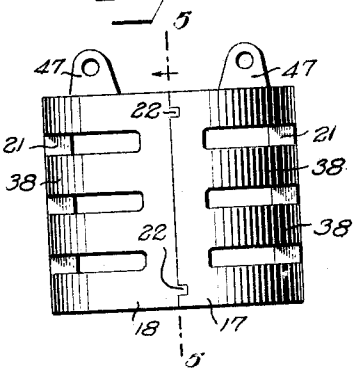


Fig. 5.

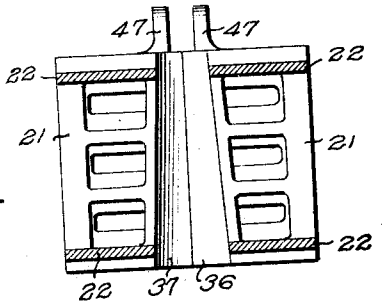
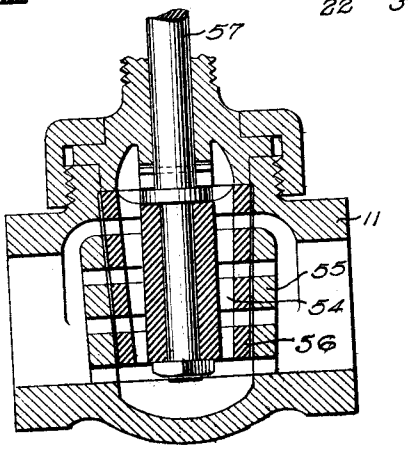


Fig. 6.



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UNITED STATES PATENT OFFICE.

OWEN J. McGOWAN, OF NEW YORK, N. Y.

VALVE.

1,193,577. Specification of Letters Patent. Patented Aug. 8, 1916.

Application filed October 30, 1915. Serial No. 58,815.

To all whom it may concern:

Be it known that I, OWEN J. McGOWAN, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Valve, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide means for effectively sealing a valve constructed and arranged in accordance with the present invention after the port-closing members have been disposed in line with the parts of the valve; to provide means for balancing the pressure on the valve; to provide a valve for exposing full opening by a minimum movement of the valve; to reduce the operating strain on the valve seat and stem; to provide a valve for automatically relieving the load thrust thereon in correspondence with the manual manipulation of the valve; to avoid wearing the valve seat; and to simplify and strengthen the construction.

Drawings.—Figure 1 is a vertical section of a valve constructed and arranged in accordance wih the present invention, the section being taken as on the line 1—1 in Fig. 2; Fig. 2 is a horizontal section, taken as on the line 2—2 in Fig. 1; Fig. 3 is a horizontal section taken as on the line 3—3 in Fig. 1; Fig. 4 is a side elevation of a valve constructed and arranged in accordance with the preferred form of the invention; Fig. 5 is a section taken as on the line 5—5 of Fig. 4; and Fig. 6 is a vertical section, showing on a reduced scale, a modified form of the invention.

Description.—As seen in the drawings, a casing 11 has end-opening passages 12 and a central chamber 13 disposed between the same. The chamber 13 in the preferred form is cylindrically bored to true the inner surfaces of the grid bars 14, which are integrally formed with the casing 11 and are separated each from the other to form passageways 15 therebetween, connecting the passages 12 and the chamber 13. The aggregate of the exposed areas of the passageways 15 is the measure of the full valve capacity. The valve casing is globular in form and the outer openings of the passageways 15 are removed from the passages 12, to relatively increase the length of the entrance end of the said passages, so that the aggregate exposed area of the said passages approximate the area of each of the passages 12.

The bars 14 are extended in web-like form between the side walls of the casing 11, as shown best in Fig. 3 of the drawings. On the median plane of the valve, the said bars are connected with vertical ribs 16, the inner surface of which ribs is flush with the inner surface of the bars 14 and form dividing partitions for the chamber 13 and guides for the webs 17 and 18 of the separable halves of the sectional valve 19, with which the preferred form of the invention is provided. The bars 14 are reinforced by the central webs 20, the inner edges of which are flush with the edges of the bars 14 and coincide with corresponding reinforcing webs 21, with which the valve members 19 are supplied, as seen best in Figs. 3 and 4 of the drawings.

The structural members of the valve 19 are held alined by the tenon rails 22 formed in one member, which in service are disposed in corresponding slots formed in the opposite member, as seen best in Figs. 4 and 5 of the drawings. When thus joined, it is obvious the sections of the valve 19 are raised and lowered simultaneously. To elevate and depress the valve, is the office of the stem 23. The stem 23 has at the exposed end a threaded section 24, with the threads of which is engaged a nut 25, on which is rigidly mounted a hand wheel 26. The nut 25 and hand wheel 26 are pivotally mounted upon and supported by a domed cross head 27, which in turn is supported by short standards 28, being held thereon by reduced threaded extensions 29 thereof and by the nuts 30 mounted on said extensions.

The standards 28 are integrally formed with the valve cap 31. Centrally disposed on the cap 31 and projected thereabove is a neck 32, which is centrally bored and fitted to the stem 23. The said neck is provided at intervals with annular grooves 33, which form water seals, to prevent the escapement of steam if the valve is used in such service, or of water if so employed. The stem 23 is held against rotation by a yoke bar 58, which is provided in the end with perforations to slide on the standards 28.

The connection between the stem 23 and the valve 19 is formed by a rectangular taper section 34. The boundary between the stem 23 and the taper section 34 is formed by a

thrust collar 35, as best seen in Fig. 1 of the drawings. The taper section 34 is inverted or is so arranged that the smaller end of the taper is juxtaposed to the collar 35 and stem 23, while the larger end of the said section is in service disposed at the bottom side of the valve 19. To fit the section 34, the sections of the valve 19 are provided with half columns 36 and 37. Columns 36 and 37 are shaped to conform with the taper of the section 34, which section thereafter rests securely between the said half columns.

From the foregoing, it is obvious that when thus mounted, if the valve 19 be held against upward travel and the stem 23 be elevated, the wedging action of the section 34 will separate the sections of the valve 19 laterally. It is this movement which is finally relied upon in the operation of the preferred form of the present invention for seating the valve and the flanges 38 thereof against the trued surfaces of the bars 14 to bridge the passageways 15 formed thereby, thus sealing the said passageways and the valve.

The normal arrangement of the valve 19 and the section 34, is that shown best in Fig. 1 of the drawings where the collar 35 rests firmly upon the upper edge of the half columns 36 and 37. The sections of the valve 19 are held against the half columns 36 and 37 by a coil spring 39. The spring 39 infolds the bolt 40 between the head thereof and a plug 41, which is driven in the tapped end of a hole 42 bored in the lower end of the section 34. The bolt 40 slides freely through the plug 41. Mounted on the lower end of the bolt 40 is a disk 43, being held thereon by a screw nut 44. The yielding connection thus formed by the spring 39 between the section 34 and the valve 19 permits the slight independent movement of the stem 23 after the arrestation of the valve 19 by the annular abutment 45 formed by the lower edge of the skirt 46 of the cap 31. The abutment 45 determines the limit of the upward lift of the valve 19.

To secure a positive action in the movement of the valve 19 by the stem 23, provision is made to lift the said valve through a rigid connection instead of the yielding connection formed by the spring 39. To this end, the valve sections are each arranged with lugs 47, which form bearings for dogs 48. Each dog 48 is pivotally mounted by bolts 49 in the lugs 47, as seen best in Figs. 1 and 2 of the drawings. At one end of each of the dogs is formed a heel 50 which bears against the inner surface of the skirt 46 to slide thereon. The heel 50 of each dog has a straight surface sufficiently long to prevent the turning of the dog on the pivot bolts 49. The heels 50 thus constructed and arranged serve to hold the toes 51 of the said dogs in bearing relation to the collar 35. From this, it will be seen that as the stem 23 is elevated, the drag of the valve 19 is imparted to the toes 51 of the dogs 48. Said dogs during the first part of the movement of the valve 19, carry the total weight until the upper edge of the said valve engages the abutment 45.

The skirt 46 is cut away to form an annular recess 52 into which the heel 50 is moved when the dogs 48 are locked. The movement of the dogs 48, is such that the toes 51 are elevated with the collar 35 as the straight surface of the heel 50 passes over to rest upon the straight shelf 53 forming the lower boundary of the recess 52. It will be noted that the lift thus exerted by the stem 23 through the collar 35 and the dogs 48, holds the valve in raised position while permitting an independent action of the stem 23, after the upper edge of the valve has engaged the abutment 45. The spread thus imparted to the section of the valve 19 which forces the stem tightly against the bars 14 and effectively closes the passageways 15, is maintained by the dogs 48.

When the hand wheel 26 is rotated in a manner to depress the stem 23, to open the passageways 15, the dogs 48 hold the valve from lowering until the collar 35 has passed to a point where the toes 51 of the dogs 48 are lowered and the heels 50 are disposed in parallel relation to the side of the skirt 46. During this portion of the movement of the stem 23, the spring 39 which has been contracted by the independent lift of the stem 23 is now permitted to extend while holding the sections of the valve 19 at the upper level or in contact with the abutment 45. This operation of the spring permits the collapsing of the sections of the valve 19, by the pressure exerted thereon from the fluid in the intake of the passages 12. In this manner, it will be seen the pressure of the controlled fluid on the valve, operates to release or unseat the valve. The moment the controlled fluid passes to the inside of the valve, the chamber 13 becomes filled and the valve is balanced. The remainder of the opening movement of the valve to the position, shown in Fig. 1 of the drawings, is relatively unresisted.

In Fig. 6 of the drawings, a modified form of the invention is shown, wherein the valve 54 is externally tapered. The inner surface of the grid bars 55 are similarly tapered to form seats for the flanges 56 of the said valve, when moved thereto by the stem 57. It will be observed that in this form of the valve, the separable sections are dispensed with.

While I have herein described the invention as adapted to cage or grid valves, it will be understood that it may be applied to other forms of valves, and such application

is considered to be within the scope of the present invention.

Claims:

1. A valve comprising a casing embodying inlet and delivery passages, and a series of parallel bars forming a centrally disposed valve chamber; a cage valve embodying a plurality of separable members each having a series of parallel passageways corresponding with the bars forming said valve chamber; a valve stem for moving said cage valve to register the solid portions of the walls thereof with the passageways between said bars; a tapered member rigidly mounted on said stem extending between said separable members for wedging the same apart; means for arresting the movement of said separable members in registry with the spaces between said bars; and means connecting said stem and said members to permit independent movement of said stem, said means embodying a compression spring normally operative to maintain the smaller section of said stem between said members.

2. A valve comprising a casing embodying inlet and delivery passages, and a series of parallel bars forming a centrally disposed valve chamber; a cage valve embodying a plurality of separable members each having a series of parallel passageways corresponding with the bars forming said valve chamber; a valve stem for moving said cage valve to register the solid portions of the walls thereof with the passageways between said bars; a tapered member rigidly mounted on said stem extending between said separable members for wedging the same apart; means for arresting the movement of said separable members in registry with the spaces between said bars; means connecting said stem and said members to permit independent movement of said stem, said means embodying a compression spring normally operative to maintain the smaller section of said stem between said members; and means for housing said spring within said tapered member, said means embodying an end-opening recess in said stem, a closure plug therefor, a supporting bolt, and a disk bearing on said members in supporting relation thereto.

3. A valve comprising a casing embodying inlet and delivery passages, and a series of parallel bars forming a centrally disposed valve chamber; a cage valve embodying a plurality of separable members each having a series of parallel passageways corresponding with the bars forming said valve chamber; a valve stem for moving said cage valve to register the solid portions of the walls thereof with the passageways between said bars; a tapered member rigidly mounted on said stem extending between said separable members for wedging the same apart; means for arresting the movement of said separable members in registry with the spaces between said bars; means yieldingly connecting said stem and said members for permitting the movement of said stem after the arrestation of said members; and means for normally preventing the separation of said members.

4. A valve comprising a casing embodying inlet and delivery passages, and a series of parallel bars forming a centrally disposed valve chamber; a cage valve embodying a plurality of separable members each having a series of parallel passageways corresponding with the bars forming said valve chamber; a valve stem for moving said cage valve to register the solid portions of the walls thereof with the passageways between said bars; a tapered member rigidly mounted on said stem extending between said separable members for wedging the same apart; means for arresting the movement of said separable members in registry with the spaces between said bars; means yieldingly connecting said stem and said members for permitting the movement of said stem after the arrestation of said members; and means normally operative to prevent the separation of said members when the solid portions thereof are not registered with the spaces between said bars.

5. A valve comprising a casing embodying inlet and delivery passages, and a series of parallel bars forming a centrally disposed valve chamber; a cage valve embodying a plurality of separable members each having a series of parallel passageways corresponding with the bars forming said valve chamber; a valve stem for moving said cage valve to register the solid portions of the walls thereof with the passageways between said bars; a tapered member rigidly mounted on said stem extending between said separable members for wedging the same apart; means for arresting the movement of said separable members in registry with the spaces between said bars; means yieldingly connecting said stem and said members for permitting the movement of said stem after the arrestation of said members; a plurality of dogs mounted on said members in engaged relation with said casing for normally preventing the operation of said members; and means embodying a recess in said casing for permitting the movement of said dogs to permit the separation of said members.

6. A valve comprising a casing embodying inlet and delivery passages, and a series of parallel bars forming a centrally disposed valve chamber; a cage valve embodying a plurality of separable members each having a series of parallel passageways corresponding with the bars forming said valve chamber; a valve stem for moving said cage valve to register the solid portions of the

walls thereof with the passageways between said bars; a tapered member rigidly mounted on said stem extending between said separable members for wedging the same apart; means for arresting the movement of said separable members in registry with the spaces between said bars; means yieldingly connecting said stem and said members for permitting the movement of said stem after the arrestation of said members; a cap for said chamber forming a guide for said stem; a plurality of dogs operatively connecting said members, said stem and said cap for moving said members without separation thereof; and means embodying a recess in said cap for releasing said dogs to permit independent movement of said stem and the separation of said members.

In witness whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OWEN J. McGOWAN.

Witnesses:
GEORGE H. EMSLEE,
EDWARD J. HOPPER, Jr.