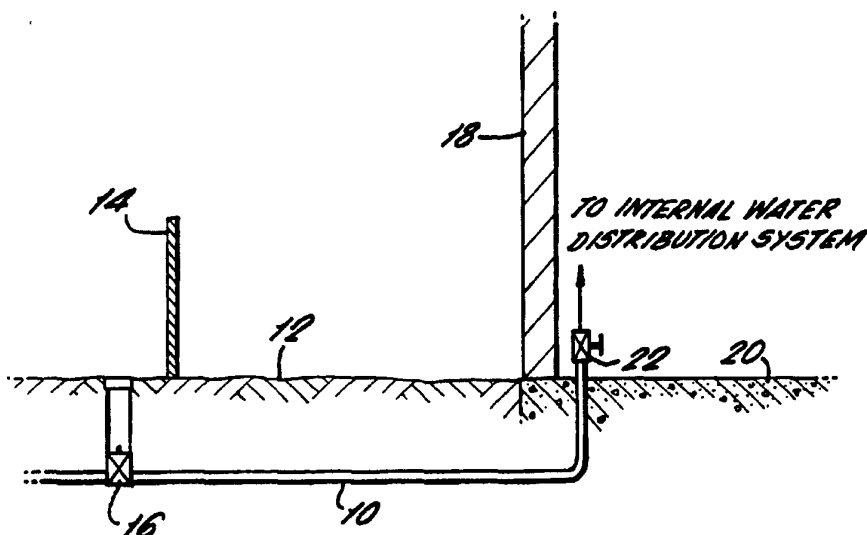




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(54) Title: ELECTRICALLY OPERATED STOP-COCK FOR MAINS WATER SUPPLY



(57) Abstract

There is described an electrically operated mains water stop-cock(22). There is also described a building (18) having an internal water distribution system in communication with an external mains water supply (10) and an electrically operated stop-cock (22) connected to the mains water supply (10), the stop-cock (22) being capable of isolating the internal water distribution system from the external mains water supply (10). There is also described the use of an electrically operated valve means (22) as a stop-cock to isolate a private water distribution system from a mains water supply (10). There is also described a method of isolating the internal water distribution system of a building (18) from an external mains water supply (10) with which the internal water distribution system is in communication comprising the steps of providing an electrically operated stop-cock (22) at the junction between the internal water distribution system and the external mains water supply (10) and actuating the stop-cock (22) to isolate the internal water distribution system.

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ELECTRICALLY OPERATED STOP-COCK FOR MAINS WATER SUPPLY

The present invention relates to an electrically operated mains water stop-cock, a building having an electrically operated stop-cock capable of isolating an internal water distribution system from an external mains water supply, the use of an electrically operated valve means as a stop-cock, and a method of isolating the internal water distribution system of a building from an external mains water supply.

In the past domestic and industrial buildings have been provided with a manual stop-cock designed to isolate an internal water distribution system from an external mains water supply. The internal water distribution system in a domestic building typically provides hot and cold running water and may also form part of the building's heat distribution system. In an industrial building the services provided by the internal water distribution system may be far more diverse.

In order to isolate the internal system from the external mains, a stop-cock is usually located at the point at which the mains water supply enters the building. A typical arrangement is shown schematically in figure 1. The conduit 10 carrying the mains water supply is laid a minimum of two feet six inches (0.762 m) below ground level 12 in order that it might be protected from frost damage and crosses the property boundary 14 after first passing to a manual stop-cock 16 which is controlled by the water company. It is at this point, as far as the United Kingdom is concerned, that the responsibility for the water supply passes from the water company to the owner or occupier of the building. The water supply then passes either under or through a wall of the building 18 and rises to just above floor level 20 at which point there is provided a private stop-cock 22 operable by the owner or occupier of the building to control the quantity of water supplied thereto.

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Turning now to a typical domestic situation, whilst people often consider turning off their heating systems or even their electricity supply while they are away from home either on holiday or on business, few people think to turn off their water supply. The consequences of not turning off the water supply however are, if anything, potentially more catastrophic. If the private stop-cock is left open the internal water distribution system of the building is connected directly to the mains supply and, via the mains supply, to a network of reservoirs. If there is a leak in the internal water distribution system this can lead, at typical rates of flow, to 240 gallons of water being deposited within the building every hour that the leak is not dealt with. If left, this same leak would result in 5,760 gallons of water being deposited within the building in a single period of twenty-four hours or 40,320 gallons in a week. Clearly such quantities of water can have a devastating effect both on the contents and structure of the building. Not only would it cause irreparable damage to the electricity distribution system but the sheer weight of water could cause floors and ceilings to give way. After all, 240 gallons of water has a weight of approximately one ton, while 5,760 gallons and 40,320 gallons have weights of approximately 26 and 183 tonnes respectively.

Furthermore, if the water supplied to the building is metered and charged for by the water company in terms of the quantities used such a leak would result in a greatly increased water bill.

Faced with this danger why it is then that people invariably fail to turn off their water supply? It is thought that this situation arises for at two reasons.

Firstly, it is thought that many people do not know where their stop-cock is located while, if they do, gaining access to it means getting down on their hands and knees and fiddling around at the back of the cupboard under the sink.

Secondly, since the stop-cock is typically as old as the building itself, they have often seized or are so stiff as to make turning them impossible without the aid of the appropriate tools. Even with the right tools there is the danger that the application of an excessive torque might cause part of the stop-cock to shear off.

It is an aim of the present invention to address the problems associated with the prior art.

According to a first aspect of the present invention there is provided an electrically operated mains water stop-cock.

Advantageously the stop-cock may be actuated by means of a switch located remotely therefrom.

Advantageously the stop-cock may be connected to an intruder alarm and actuated on actuation of the alarm system.

Advantageously the stop-cock may comprise a solenoid valve.

According to a second aspect of the present invention there is provided a building having an internal water distribution system in communication with an external mains water supply and an electrically operated stop-cock connected to the mains water supply, the stop-cock being capable of isolating the internal water distribution system from the external mains water supply.

Advantageously the stop-cock may be actuated by means of a switch located remotely therefrom.

Advantageously the building may be provided with an intruder alarm system to which the stop-cock is connected, the stop-cock being actuated on actuation of the alarm system.

Advantageously the stop-cock may comprise a solenoid valve.

According to a third aspect of the present invention there is provided the use of an electrically operated valve means as a stop-cock to isolate a private water distribution system from a mains water supply.

According to a fourth aspect of the present invention there is provided a method of isolating the internal water distribution system of a building from an external mains water supply with which the internal water distribution system is in communication comprising the steps of providing an electrically operated stop-cock at the junction between the internal water distribution system and the external mains water supply and actuating the stop-cock to isolate the internal water distribution system.

Advantageously the stop-cock may be actuated by means of a switch located remotely therefrom.

Advantageously the building may be provided with an intruder alarm system to which the stop-cock is connected and the stop-cock actuated on actuation of the alarm system.

Electrically operated valves, such as solenoid valves, are known and have in the past been used to control the passage of liquids such as water. Their use however as a mains water stop-cock has not previously been contemplated and enables the problems associated with the prior art to overcome. Instead of requiring specialist tools in order to rotate a stiff tap, all that is required to actuate a solenoid valve is the flick of a switch. Likewise, since the switch may be located at a position remote from the valve, the owner or occupier of the building need no longer crawl around in search of the stop-cock. Instead, the switch may be located close to the front door at the same height as the light switch so as to be easily actuated on departure.

In one preferred embodiment the stop-cock may be connected to an intruder alarm system and actuated on actuation of the alarm system. In this way when the owner or occupier leaves the building and as a matter of routine actuates the alarm system he simultaneously actuates the stop-cock and isolates the internal water distribution system from the mains water supply.

A range of electrically operated valves are manufactured by many companies such as, for example, in United Kingdom by Danfoss Limited of Perivale Industrial Park, Greenford, Middlesex UB6 7QE.

One advantage of using a solenoid valve as the electrically operated stop-cock is that in the event of an electrical power failure, the valve will automatically close isolating the building's internal water distribution system from the external mains supply. If required, the valve can be reopened manually by the use of a suitable magnet before the electricity supply is restored.

Another advantage of a solenoid valve is that its electrical components are completely enclosed in a water-tight casing so that in the event of a leak elsewhere in the internal water distribution system the solenoid valve may still be actuated to isolate the system without endangering the user.

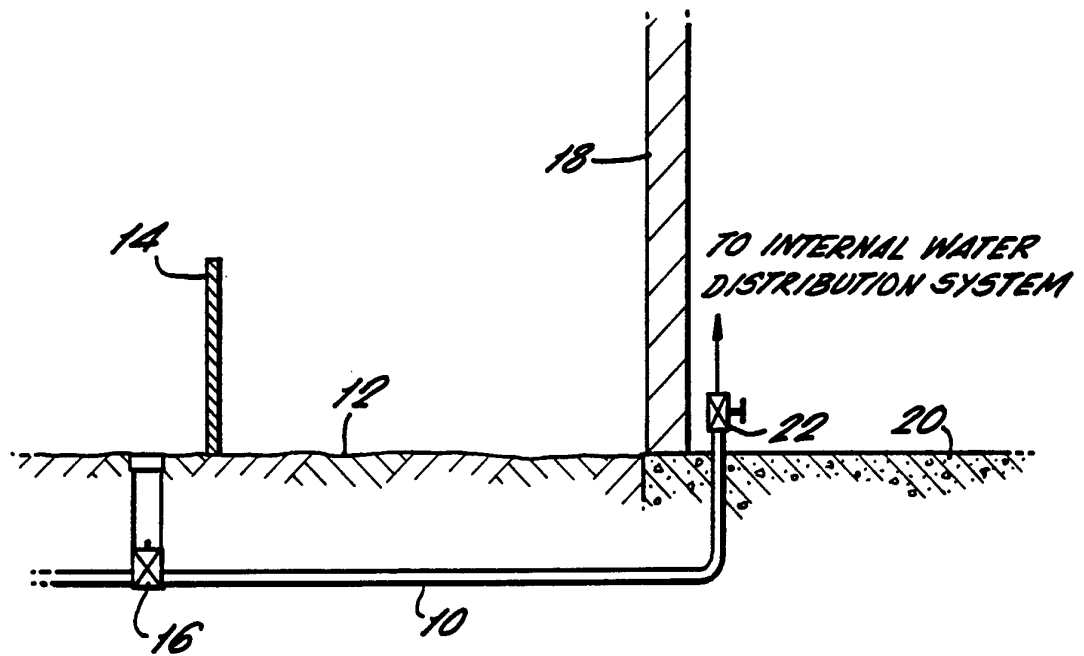
In existing buildings where a manual stop-cock is already provided, the electrically operated stop-cock of the present invention may be placed in series adjacent the existing stop-cock. The existing stop-cock may then simply be left in the open position and the electrically operated stop-cock actuated in the manner previously described in order to control the supply of mains water to the building.

CLAIMS

1. An electrically operated mains water stop-cock.
2. A stop-cock in accordance with claim 1, wherein the stop-cock is actuated by means of a switch located remotely therefrom.
3. A stop-cock in accordance with claim 1 or claim 2, wherein the stop-cock is connected to an intruder alarm system and is actuated on actuation of said alarm system.
4. A stop-cock in accordance with any preceding claim, wherein the stop-cock comprises a solenoid valve.
5. A building having an internal water distribution system in communication with an external mains water supply and an electrically operated stop-cock connected to the mains water supply, the stop-cock being capable of isolating the internal water distribution system from the external mains water supply.
6. A building in accordance with claim 5, wherein the stop-cock is actuated by means of a switch located remotely therefrom.
7. A building in accordance with claim 5 or claim 6, wherein the building is provided with an intruder alarm system to which the stop-cock is connected, the stop-cock being actuated on actuation of said alarm system.
8. A building in accordance with any of claims 5 to 7, wherein the stop-cock comprises a solenoid valve.
9. A building in accordance with any of claims 5 to 8, wherein the stop-cock is connected in series with a manually operated stop-cock.

10. Use of an electrically operated valve means as a stop-cock to isolate a private water distribution system from a mains water supply.
11. A method of isolating the internal water distribution system of a building from an external mains water supply with which the internal water distribution system is in communication comprising the steps of providing an electrically operated stop-cock at the junction between the internal water distribution system and the external mains water supply and actuating the stop-cock to isolate the internal water distribution system.
12. A method in accordance with claim 11, wherein the stop-cock is actuated by means of a switch located remotely therefrom.
13. A method in accordance with claim 11 or claim 12, wherein the building is provided with an intruder alarm system to which the stop-cock is connected and the stop-cock is actuated on actuation of said alarm system.

FIG. 1.



INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 94/01413

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E03B7/07

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 E03B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A,5 004 014 (R. BENDER) 2 April 1991 see column 2, line 31 - column 3, line 18 see column 3, line 65 - column 4, line 18 see column 7, line 49 - column 8, line 56; figure 1	1-3,5-7, 10
Y	---	8,13
X	US,A,5 076 321 (P. TERRY) 31 December 1991 see column 2, line 35 - column 3, line 10 see column 4, line 57 - column 5, line 36	1,2,5,6, 9
X	GB,A,2 248 469 (B. GILLIS) 8 April 1992 see page 2; figures	1,2,4
Y	---	8
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A,5 107 883 (D. SHAW) 28 April 1992	1,2,11, 12
Y	see column 2, line 39 - line 53 -----	13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 94/01413

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-5004014	02-04-91	AU-A- 8209091 WO-A- 9200478	23-01-92 09-01-92
US-A-5076321	31-12-91	NONE	
GB-A-2248469	08-04-92	NONE	
US-A-5107883	28-04-92	US-A- 5131423	21-07-92