The invention relates to a plastic-based angle ball valve (1) for radiators and to the production method thereof, wherein it comprises a welding socket (8) which is integrated with the valve body (6) and formed in the same y-axis as that of said valve body and a moving group (7) operating in the same y-axis as that of said welding socket (8).
Published:
— with international search report (Art. 21(3))
Description

PLASTIC-BASED ANGLE BALL VALVE FOR RADIATORS AND PRODUCTION
METHOD THEREOF

Technical Field

The invention relates to plastic-based angle ball valves which allow direct connection of radiators with plastic-based pipes without requiring the use of adapters that otherwise permit the connection thereof with plastic-based pipes in heating industry.

The invention more particularly relates to the production method of plastic-based angle ball valves that allow direct connection of radiators with plastic pipes without requiring the use of plastic-based adapters.

Background of the Invention

Today, radiators are widely used in indoor areas, e.g. houses, work places, in heating industry. The connection between the radiators and pipes is achieved by radiator valves. Radiator valves can stop fluid flow when desired.

Said ball radiator valves are produced of metal-based material today. In order for the radiator valves to be connected to the plastic pipe system after mounting thereof in the radiator, it is required that they are mounted with plastic-based adapter having metal insert.

There is no other way of connection to the plastic-based pipe. Metal-based radiator valve can be produced by metal processing methods and it can only be connected by means of a screw thread system.

Therefore, the plastic-based adapter comprising metal insert is mounted in the valve through the insert side thereof by means of screw connection while the plastic side of the adapter is mounted in the plastic-based pipe by socket welding.

In said system, plastic-based adapter is an extra part that is needed to be used. Said adapter causes some financial and technical losses in the heating system as follows:
Since screw threaded connection is performed and the use of an extra adapter is a must, each joint increases the possibility of leakage. Additional time and labor costs are incurred for connecting the plastic-based adapter, which creates a disadvantage for the system together with the cost of plastic-based adapter itself.

Another application in this field is the plastic-based ball radiator valves which are directly connected to metal radiators without requiring the use of an additional adapter. The disadvantage of these valves is that their body structures must be produced in a way to be big in size, which results in the necessity of consumption of more raw material and of using molds bigger in size, and thus requiring that bigger injection machines are preferred.

The patent search on the state of the art revealed the Patent Application No. TR2007/02519. The abstract of this application is as follows: the invention relates to a radiator valve which comprises at least one bottom entry ball/globe valve, at least one valve tail allowing connection with the radiator, and at least one insert connected to said valve tail; wherein it further comprises a plastic adapter configured on the plastic valve body in an integrated manner.

Description of the Invention

The object of the invention, by being inspired by the state of the art, is to make plastic-based angle ball valves for radiators lighter and to allow the connection thereof with the plastic pipes without using an intermediate adapter.

Another object of the invention is to eliminate leakage problem as a result of eliminating the requirement for use of a plastic adapter having metal insert.

Another object of the invention is to lower production costs since there is no need for an additional adapter for the connection.

Another object of the invention is to eliminate additional labor force needed for mounting process since there is no need for an additional adapter for the connection.

Another object of the invention is to shorten the time required for mounting since there is no need for an additional adapter for the connection.
Yet another object of the invention is to lower mold investment costs by allowing
production with molds of smaller size due to the fact that said valve has a body that is
smaller in volume.

And another object of the invention is to lower investment costs by allowing the choice
of injection machines with smaller capacity as a result of the fact that said valve has a
smaller body and is produced in molds of smaller size.

In order to achieve the aforementioned objects, the invention relates to a radiator valve
having a welding socket produced in an integrated manner with the valve body; wherein it
comprises a welding socket which is integrated with the valve body and formed in the
same y-axis as that of said valve body and a moving group operating in the same y-axis
as that of said welding socket.

Description of the Figures

Fig. 1 is the perspective view of the plastic-based angle ball valve for radiators
Fig. 2 is the side cross-sectional view of the plastic-based angle ball valve for radiators
Fig. 3 is the cross-sectional mounted view of the mold used in the production of plastic-
based angle ball valve for radiators

Reference Numerals

1. Radiator valve 35  7.4 Ball
2. Metal insert 7.5 Inner body
3. Valve tail 8. Welding socket
5. Flywheel 10. Movable mold pin
6. Valve body 11. Stable mold pin
6.1 Connection inlet 12. Stable mold plate
7. Moving group 13. Movable mold plate
7.1 Flywheel shaft 14. Contact point
7.2 Shaft shell 15. Stage
7.3 Sealing members
Detailed Description of the Invention

The invention is a radiator valve (1) which has a welding socket (8) which is produced in a way to be integrated with the valve body (6), i.e. as a single piece. It comprises a welding socket (8) which is integrated with the valve body (6) and formed in the same y-axis as that of said valve body and a moving group (7) operating in the same y-axis as that of said valve body (6) and of said welding socket (8).

It also has a metal insert (2) fixed in the connection inlet (6.1) of said valve body (6) and a valve tail nut (4) allowing connection between said metal insert (2) and valve tail (3). Also comprised is an inner body (7.5) which integrally holds said flywheel shaft (7.1), shaft shell (7.2), and the ball (7.4); has a two-piece structure; and is provided thereon with a contact point (14).

In Fig. 1, the perspective view of the plastic-based angle ball valve (1) for radiators is illustrated.

Said angle ball valve (1) for radiators is made of the following main components; valve tail (3), metal insert (2), valve tail nut (4), flywheel (5), moving group (7), and welding socket (8) integrated with the valve body (6).

The angle ball valve (1) for radiators is connected to the radiator by being screwed by means of the valve tail (3).

The welding socket (8) is formed integrally with the valve body (6) as an extension thereof and enables the angle ball valve (1) for radiators to be directly connected with plastic tubes by means of socket welding.

Said valve body (6) encloses the moving group (7), at the same time embedding the flywheel (5), as well.

In the preferred embodiment of the invention, said valve body (6) is made of plastic material or plastic derivatives.

In Fig. 2, the side cross-sectional view of said plastic-based angle ball valve (1) for radiators is illustrated.
Said valve tail (3), metal insert (2) and valve tail nut (4) are made of metal material; wherein the metal insert (2) is fixed in the valve body during injection stage, and wherein the valve tail (3) and the valve tail nut (4) are connected with the valve body (6) by being screwed on the metal insert (2). The valve tail (3) is located in the radiator by also being screwed and the valve tail nut (4) positioned on the valve tail (3) fixes the plastic-based angle ball valve (1) for radiators onto the radiator thanks to the movable connection property thereof.

The production of the plastic-based angle ball valve (1) for radiators is achieved by the pin system disposed in the plastic injection mold (9), as well as by the movable mold body (13) and the stable mold body (12).

In Fig. 3, the cross-sectional mounted view of the mold (9) for the plastic-based angle ball valve for radiators is given.

First, a metal insert (2) is located on the stable mold pin (11) which is disposed in said mold (9).

Afterwards, the moving group (7) is positioned on said stable mold pin (11).

During closure of the movable mold plate (13) in direction b, movable mold pin (10) moves in direction d, either simultaneously or independently. Said movable mold pin (10) centralizes the moving group (7) through the ball (7.4) hole. When the mold is fully closed, the movable mold plate (13) contacts with the moving group (7) through the contact point thereof, thereby performing fixation by compressing said moving group (7) between the stage (15) on the stable mold pin (11) and the movable mold plate (13), and thus making the moving group (7) to act as a non-movable single piece. Hence, the pressurized fluid is prevented from leaking through the joint of the moving group (7) or from displacing it during injection process. The ball valve body (6) is formed by the injection of the plastic material into the mold (9) by means of the injection machine.

While the movable mold plate (13) opens in direction a, the movable mold pin (10) moves in direction c and gets away from the stable mold plate (12). Thus, the angle ball valve for radiators which is formed integrally with the welding socket (8) and the valve body (6) is allowed to be removed from the stable mold plate (12).
As a result, the valve body (6) is produced as a single piece in a way to include welding socket (8), metal insert (2), and moving group (7) which together form the plastic-based angle ball valve (1) for radiators.

The production of the plastic-based angle ball valve (1) for radiators is completed by mounting the flywheel (5) into the moving group (7) located inside the valve body (6), and mounting the valve tail (3) and the valve tail nut (4) into the metal insert (2).

The valve tail (3) located on the plastic-based angle ball valve (1) for radiators, the production of which has thus been completed, is connected to the radiator by preferably winding thereon linen or teflon.

The body (6) of the plastic-based ball radiator valve (1) and the welding socket (8) formed as an extension thereof as a single piece are welded in the plastic pipe by socket welding.

The valve tail nut (4) disposed on the valve tail (3) connected to the radiator and the metal insert (2) are screwed to one another and the plastic-based angle ball valve (1) for radiators is connected with the radiator. The plastic-based angle ball valve (1) for radiators is turned on and off by being controlled by the flywheel (5).

The hot water inside the plastic tube gets to the radiator thanks to the plastic-based angle ball valve (1) for radiators and said hot water heats the radiator, which, in turn, heats the environment.
CLAIMS

1. A plastic-based angle ball valve (1) for radiators which has a welding socket (8) which is produced integrally with the valve body (6), characterized in comprising;
   - an integrated welding socket (8) which is formed in the same y-axis as that of said valve body (6),
   - a moving group (7) operating in the same y-axis as that of said valve body (6) and of said welding socket (8), and
   - having a two-piece structured inner body (7.5) on which a contact point (14) is created; and which is integrating a flywheel shaft (7.1), shaft shell (7.2), ball (7.4) located inside said valve.

2. A production method of the plastic-based angle ball valve (1) for radiators which has a welding socket (8) which is produced integrally with the valve body (6), characterized in comprising the process steps of;
   - locating said metal insert (2) and moving group (7) on the said stable mold pin (11) positioned in x-axis in said mold (9),
   - moving in direction d either simultaneously or independently of the movable mold pin (10) which is placed on the stable mold plate (12) by the movement of the said movable mold plate (13) in direction b,
   - fixing by compressing of the moving group (7) between the contact point (14) and the stage (15) above on the stable mold pin (11) by moving the movable mold plate (13) in direction b,
   - injecting the plastic material into said mold (9) by means of an injection machine and forming the welding socket (8) integrated with the valve body (6) in the same y-axis thereof,
   - configuring a moving group (7) operating in the same y-axis as that of said valve body (6) and of said welding socket (8).
- capturing the metal insert (2) and moving group (7) inside the thus formed valve body (6), and
- removing the valve body (6) from said mold (9) by the opening of said movable mold pin (10) and the movable mold plate (13), the former moving in direction c and the latter moving in direction a independently or simultaneously.

3. The production method according to Claim 2, characterized in comprising the process steps of:

- upon moving of the movable mold plate (13) in direction b and fully closure thereof, said movable mold plate (13) compressing the moving group (7) between the contact point (14) and the stage (15) above on the stable mold pin (11), and thus fixing the same,
- at the same time centralizing of the moving group (7) through the hole thereof on the y-axis of the ball (7.4) by means of the movable mold pin (10),
- preventing the pressurized fluid from leaking through the joint place of the moving group (7) or preventing the moving group (7) from losing its position on the y-axis during injection process, and
- protecting the tightness property of the valve during final use.
**INTERNATIONAL SEARCH REPORT**

**International application No**

PCT/TR2014/00Q417

---

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. F24D19/00 B29C45/14 B29C45/33 F16K5/06 F16K27/06

---

**ADD.**

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)

F24D B29C F16K

---

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>wo 2008/127208 AI (KALDE KLIMA ORTA BASINC FITTIN [TR]; TOPALYAN AKSEL [TR]) 23 October 2008 (2008-10-23) cited in the application on page 1, lines 11-13; figures 1-2 page 4, lines 13-19 page 6, lines 4-17 page 7, lines 1-24; figure 3</td>
<td>1-3</td>
</tr>
<tr>
<td>Y</td>
<td>EP 0 666 439 AI (LOPEZ CARRION FRANCISCA [ES]; BALLESTER JULIA C [ES]) 9 August 1995 (1995-08-09) abstract; claim 1; figures 1,3</td>
<td>1-3</td>
</tr>
<tr>
<td>Y</td>
<td>US 4 809 949 A (RAKI ESKI KENNETH E [US]) 7 March 1989 (1989-03-07) abstract; figure 2</td>
<td>1-3</td>
</tr>
</tbody>
</table>

---

**Further documents are listed in the continuation of Box C.**

**See patent family annex.**

---

<table>
<thead>
<tr>
<th>Date of the actual completion of the international search</th>
<th>Date of mailing of the international search report</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 March 2015</td>
<td>18/03/2015</td>
</tr>
</tbody>
</table>

---

**Name and mailing address of the ISA:**

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

**Authorized officer:**

Degen, Marcel 10

---

Form PCT/ISA/210 (second sheet) (April 2009)
### DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>GB 2 470 602 A (BENHAM JAMES [GB]) 1 December 2010 (2010-12-01) abstract; figure 1</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Form PCT/SA/210 (continuation of second sheet) (April 2008)
<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>WO 2008127208 Al</td>
<td>23-10-2008</td>
<td>DK 2140185 T3</td>
<td>27-01-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 200970157 Al</td>
<td>30-06-2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EG 25750 A</td>
<td>24-06-2012</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 2140185 Al</td>
<td>06-01-2010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ES 2442900 T3</td>
<td>14-02-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 30622 Bl</td>
<td>03-08-2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PT 2140185 E</td>
<td>14-01-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SI 2140185 T1</td>
<td>31-03-2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TR 200702519 A2</td>
<td>22-10-2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UA 96454 C2</td>
<td>10-11-2011</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 2008127208 Al</td>
<td>23-10-2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 69414688 DI</td>
<td>24-12-1998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 69414688 T2</td>
<td>09-09-1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DK 0666439 T3</td>
<td>21-06-1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 0666439 Al</td>
<td>09-08-1995</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GR 3029403 T3</td>
<td>28-05-1999</td>
</tr>
<tr>
<td>US 4809949 A</td>
<td>07-03-1989</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>BR 0108355 A</td>
<td>11-03-2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CZ 20022789 A3</td>
<td>15-01-2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 10007204 Al</td>
<td>06-09-2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1264127 Al</td>
<td>11-12-2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ES 2208576 T3</td>
<td>16-06-2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HU 0204512 A2</td>
<td>28-04-2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 3615736 B2</td>
<td>02-02-2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2003522925 A</td>
<td>29-07-2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PL 357646 Al</td>
<td>26-07-2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PT 1264127 E</td>
<td>31-03-2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2003015680 Al</td>
<td>23-01-2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 0161223 Al</td>
<td>23-08-2001</td>
</tr>
<tr>
<td>GB 2470602 A</td>
<td>01-12-2010</td>
<td>NONE</td>
<td></td>
</tr>
</tbody>
</table>

Form PCT/SA/210 (patent family annex) (April 2005)