

The present invention relates to a domestic water station according to the preamble of Patent Claim 1.

Domestic water stations of this type are normally connected between a fresh water pipe leading into the house and a main water pipe existing inside the house and have to fulfil substantially two objectives:

- The pressure in the fresh water pipe leading into the house is generally not only relatively high, but fluctuates within certain limits. Therefore, these domestic water stations contain a pressure relief valve, which has the task of reducing the pressure prevailing in the fresh water pipe leading into the house to a predetermined, generally adjustable value and of keeping it at this predetermined pressure value, irrespective of pressure fluctuations on the inlet side.
- The fresh water piped into the house may contain particles of dirt, which may impair the function of the fittings and appliances within the house. A filter is therefore provided in the domestic water station, through which the fresh water is first of all passed, in order to filter out at least the coarsest particles of dirt.

Requirements which are made of such a domestic water station, are above all small, compact dimensions, in order that it can be fitted without problems, even in restricted conditions, in the fresh water pipe leading into the house, possibly even subsequently, for example in place of a conventional existing pressure reducer without filter, a reliable operation of the pressure relief valve and, in the case of a breakdown, simple maintenance or repairs thereof and finally good accessibility to the filter, since the latter must be cleaned from time to time.

CH-PS 581 862 discloses a pressure reducer, in particular for domestic water installations, which corresponds to the

type mentioned above, thus in addition to the pressure relief valve also comprises a filter. Indeed, the pressure reducer according to the Swiss PS cited may also have a relatively compact construction, however the flow of water through the pressure relief valve from the filter is from the bottom upwards and furthermore it is incorporated in the housing so that it cannot be exchanged easily as a total unit. The flow from the bottom upwards is a further drawback which influences the operating reliability of the pressure relief valve in a disadvantageous manner, since particles of dirt are always let through by the filter, which after a certain time impair the operation of the pressure relief valve. Therefore, in the case of a disturbance, a repair or exchange of the actual pressure relief valve can only be implemented with difficulty.

US-A-3 695 449 discloses a domestic water station, which likewise comprises a filter for filtering-out particles of dirt, a pressure relief valve through which the water flows from above and a valve chamber, which is closed with respect to the outlet of the filter. In the embodiment described in this printed specification, the fresh water flows through the filter from the inside outwards. This has the drawback that the particles of dirt are deposited within the filter and that therefore the periodically necessary cleaning of this filter is very awkward. A further drawback lies in the type of arrangement and attachment of the pressure relief valve, since in the cited printed specification the latter is attached to the valve chamber within the housing and therefore cannot be readily exchanged if required.

It is the object of the present invention to develop a domestic water station of the aforescribed type so that the parts which are subject to contamination, whilst maintaining the desired compact dimensions, can be cleaned more easily or if need be can be exchanged.

According to the invention, this object is achieved by the features described in the characterising part of Patent Claim 1. It is thus ensured that fresh water flows through the filter from the outside inwards and therefore the particles of dirt accumulate on the outside of the filter in an annular chamber. Furthermore it is ensured that the pressure relief valve is attached so that it is accessible from outside, the throughflow direction of the water through the pressure relief valve being maintained from the top downwards.

In order to keep the pressure drop between the filter outlet and the preliminary chamber as low as possible, two overflow channels are preferably provided.

In order that the compact design, desired according to the invention, can be realised, it is advantageous if the two overflow channels have a cross-section in the shape of a sector of a circular ring and are arranged coaxially with respect to the valve chamber on both sides of the valve chamber outlet. Also contributing to this is the further advantageous measure that the inlet connection is connected to the filter hood by way of a channel having a cross-section in the shape of a sector of a circular ring, which is arranged coaxially with respect to the valve chamber.

In order to attach the pressure relief valve as an exchangeable unit to the casing, it is provided that the preliminary chamber has a greater diameter than the valve chamber. Due to this the flow conditions and cross-sectional conditions required for a troublefree operation of the pressure relief valve can be provided.

In this advantageous embodiment, it is recommended to choose a construction in which the pressure relief valve unit has a control part located on a flange of larger diameter

and a valve part located on a flange of smaller diameter, which two parts are connected to each other by a spindle, the pressure relief valve unit closing off the preliminary chamber by its flange of larger diameter and the valve chamber by its flange of smaller diameter. Thus separate components for the closure of the two chambers are made superfluous and the assembly is further facilitated in the case of a repair.

One embodiment of the domestic water station according to the invention will be described in detail hereafter, with reference to the accompanying drawings, in which:

Figure 1 is a side view of the domestic water station, partly in section;

Figure 2 is a section through the casing of the domestic water station along a first vertical plane;

Figure 3 is a horizontal section through the casing along the line III-III of Figure 2; and

Figure 4 is a section through the casing of the domestic water station along a second vertical plane rotated through 90° with respect to the illustration in Figure 2.

Figure 1 shows a domestic water station designated generally by the reference numeral 1, which comprises a casing designated generally by the reference numeral 2, which comprises an inlet connection 3 and an outlet connection 4. The two connections 3 and 4 are arranged coaxially, extending substantially horizontally, so that the domestic water station 1 can be fitted in a fresh water pipe (not shown), possibly even subsequently.

Provided on the lower part of the casing 2 is a filter unit designated generally by the reference numeral 5; the

latter comprises a filter hood 6 releasably attached to the casing 2, whereby the attachment may appropriately take place by means of a collar nut 7. The filter hood 6 receives a filter gauze 8 of smaller diameter than the filter hood 6, the filter gauze 8 being connected by its upper end, by way of a gasket 9, to the casing 2 and at its lower end, by way of a gasket 10, to the filter hood 6. Consequently the filter hood 6 is divided into an outer, annular chamber 11 and an inner chamber 12.

The casing 2 furthermore receives a pressure relief valve unit designated generally by the reference numeral 14, which comprises an upper flange 15 of larger diameter and a lower flange 16 of smaller diameter. Located on the upper flange 15 is the control part 17 of the pressure relief valve unit and on the lower flange 16 the valve part 18 of the same. The two flanges 15 and 16 are connected to each other by way of webs 13 and the two parts 17 and 18 are connected to each other by means of a spindle 19. Thus, the pressure relief valve unit 14 forms an independent component in the form of a compact insert.

The operation and construction of the pressure relief valve unit 14 is known per se and does not need to be described again at this point. For the sake of completeness, it should be mentioned that located on the upper part of the casing 2 is a spring hood 20, which receives a spring (not shown), which is adjustable as regards pre-tension, which rests on the control part 17.

The casing 2 comprises a valve chamber 21, which is located substantially centrally in the casing 2 and which opens radially into the outlet connection 4. Towards the under side, i.e. towards the filter unit 5, the valve chamber 21 is closed. At the top, the valve chamber 21 has a round opening, in which the valve part 18 is hermetically inserted

by the flange 16 of smaller diameter. Constructed above the valve chamber 21 is a preliminary chamber 22, with an upper opening, in which the control part 17 of the pressure relief valve unit 14 is hermetically inserted by its larger flange 15. The entire pressure relief valve unit 14 is attached to the casing 2 by means of a releasable connection 30.

The chamber 12 inside the filter gauze 8 is open at its upper end and opens into a collecting chamber 23, which is connected to the preliminary chamber 22 by means of overflow channels 24. As shown clearly particularly in Figure 3, two overflow channels 24 are provided, which have a cross-section in the shape of a sector of a circular ring and are arranged coaxially with respect to the valve chamber 21, on both sides of the valve chamber outlet 25.

The inlet connection 3 of the casing 2 is connected by way of an inlet channel 26 likewise having a cross-section in the shape of a sector of a circular ring, to the annular chamber 11 formed around the filter gauze 8; the inlet channel 26 is also, lying opposite the two overflow channels 24, arranged coaxially with respect to the valve chamber 21.

As is apparent in particular from Figures 2 and 4, the valve chamber 21 has a smaller cross-section than the preliminary chamber 22 located thereabove and connected to the latter by way of the valve part 18 of the pressure relief valve unit 14.

In Figure 1, the flow direction of the water flowing through the domestic water station 1 or the flow behaviour is represented diagrammatically by the arrowed line 27. Thus, the fresh water enters the casing 2 of the domestic water station 1 through the inlet connection 3 and passes by way of the inlet channel 26 into the annular chamber 11. A certain pressure builds up in the latter, so that

the water enters the inner chamber 12 through the filter gauze 8. At least the coarser particles of dirt are removed at this time; the latter remain on the outer surface of the filter gauze 8, which must obviously be cleaned in known manner from time to time.

The purified water now flows from the inner chamber 12 into the collecting chamber 23 above the filter unit 5 and passes by way of the overflow channels 24 into the preliminary chamber 22, where it acts upon the control part 17 of the pressure relief valve unit 14 in known manner. According to the pre-set pressure, which is exerted on the control part 17 by the spring received in the spring hood 20, the valve part 18 opens to a greater or lesser extent, so that the water can flow from the preliminary chamber 22 into the valve chamber 21 and can leave the latter through the outlet 25 or outlet connection 4.

Due to the measure that water flows through the pressure relief unit 14 from the top downwards, a surprisingly low susceptibility to contamination of the valve part 18 and thus exceptionally high reliability of the operation of the pressure relief valve unit 14 results. Due to the coaxial arrangement of the valve chamber 21 on the one side and inlet channel 26 or overflow channels 24 on the other side, a very compact construction of the entire domestic water station 1 can be achieved. In the case of a breakdown, the pressure relief valve unit 14 constructed as an independent insert can be easily removed and cleaned, or exchanged.

If necessary, the casing 2 may be provided with connection sockets 28, which are connected by way of a channel 29 (Figure 3) to the valve chamber 21, in order to receive a pressure gauge (not shown).



Claims

1. Domestic water station with a casing (2), which comprises an inlet connection (3) and an outlet connection (4) with a substantially coaxial, horizontal arrangement and receives a spring-loaded pressure relief valve unit (14) and with a filter (8) on the downstream side of the inlet connection (3), which filter is located below the pressure relief valve unit (14) in a filter hood (6), the filter (8) having a smaller diameter than the filter hood (6), so that an annular chamber (11) is formed, the casing (2) comprising a valve chamber (21) closed towards the outlet of the filter (8), which valve chamber (21) opens into the outlet (4) and a preliminary chamber (22) located above the valve chamber (21) being provided, which is connected by way of at least one overflow channel (24) to the outlet of the filter (8), characterised in that the pressure relief valve unit (14) is attached to the casing (2) by means of a connection (30) which is releasable from outside, and that the inlet connection (3) opens by way of a channel (26), located coaxially with respect to the valve chamber, directly into the annular chamber (11) formed by the filter (8) and the filter hood (6).
2. Domestic water station according to Patent Claim 1, characterised in that the pressure relief valve unit (14) is attached to the casing (2) by means of a screw connection.
3. Domestic water station according to Patent Claim 1, characterised in that for the purpose of cleaning the filter, the filter hood (6) is exchangeably attached to the casing (2).
4. Domestic water station according to Patent Claim 1, characterised in that two overflow channels (24) with a cross-section in the shape of a sector of a circular ring



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are provided, which are arranged coaxially with respect to the valve chamber (21) on both sides of the valve chamber outlet (25).

5. Domestic water station according to Patent Claim 1, characterised in that the channel (26) arranged coaxially with respect to the valve chamber (21) has a cross-section in the shape of a sector of a circular ring.

6. Domestic water station according to one of the preceding Patent Claims, characterised in that the preliminary chamber (22) has a greater diameter than the valve chamber (21).

7. Domestic water station according to one of the preceding Patent Claims, characterised in that the pressure relief valve unit (14) has a pressure relief valve inserted in the casing (2).

8. Domestic water station according to Patent Claim 7, characterised in that the pressure relief valve unit (14) has a control part (17) located on a flange (15) of larger diameter and a valve part (18) located on a flange (16) of smaller diameter, which two parts (17, 18) are connected to each other by a spindle (19).

9. Domestic water station according to Patent Claim 8, characterised in that the pressure relief valve unit (14) closes off the preliminary chamber (22) by its flange (15) of larger diameter and closes off the valve chamber (21) by its flange (16) of smaller diameter.

10. Domestic water station according to Patent Claim 8, characterised in that the pressure relief valve unit (14) is arranged so that the fresh water flows through the pressure relief valve unit (14) from the top in a downwards direction.