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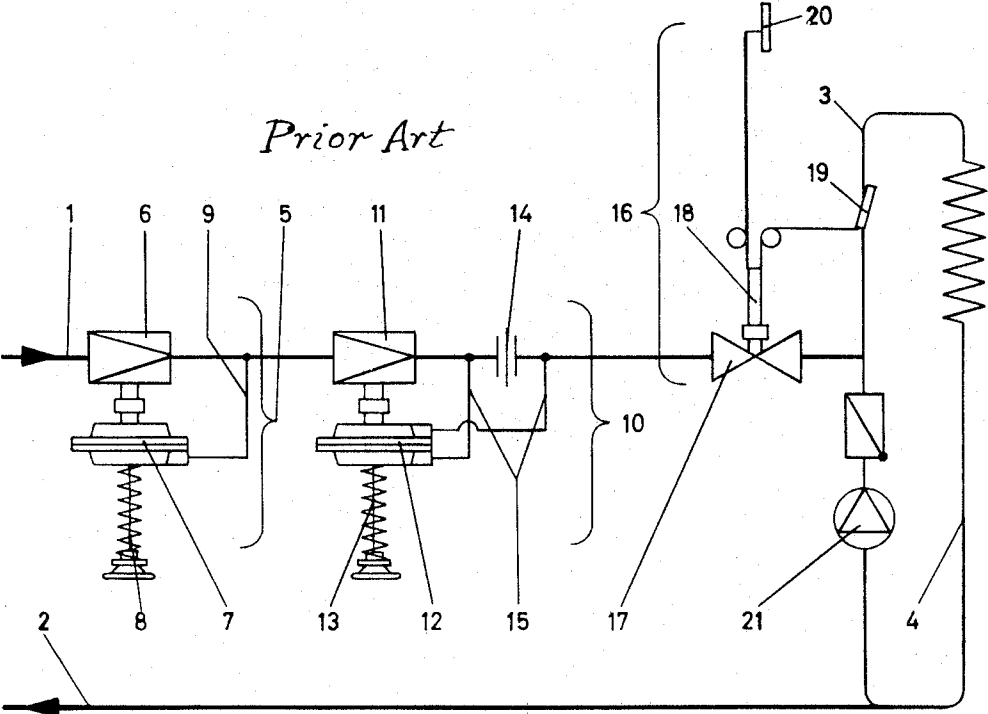
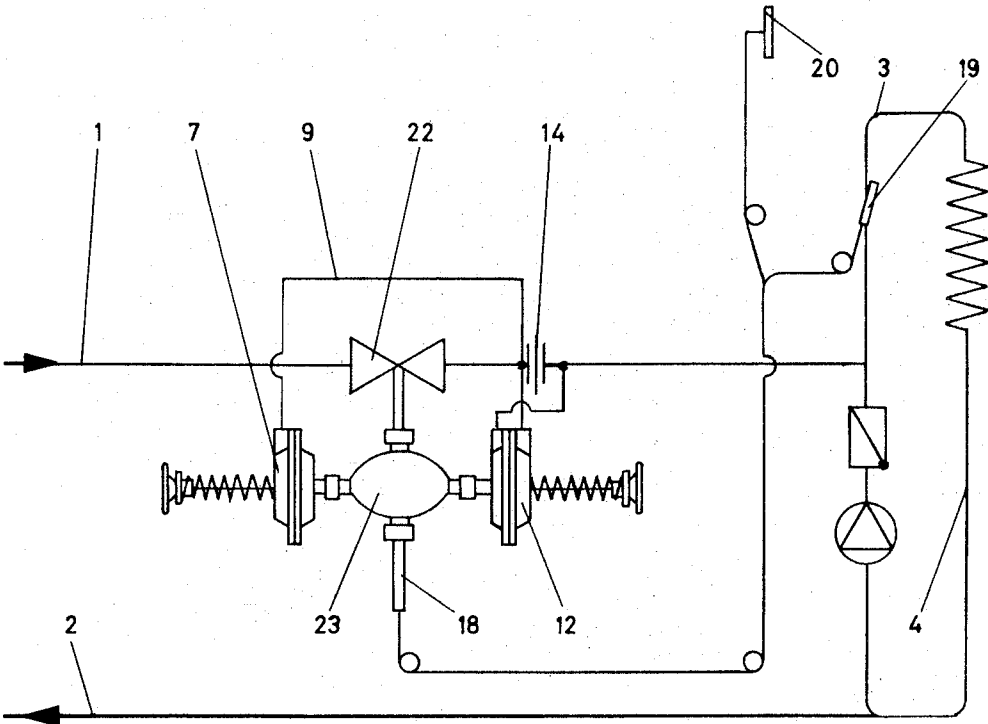
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3,479,003

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2 Sheets-Sheet 1



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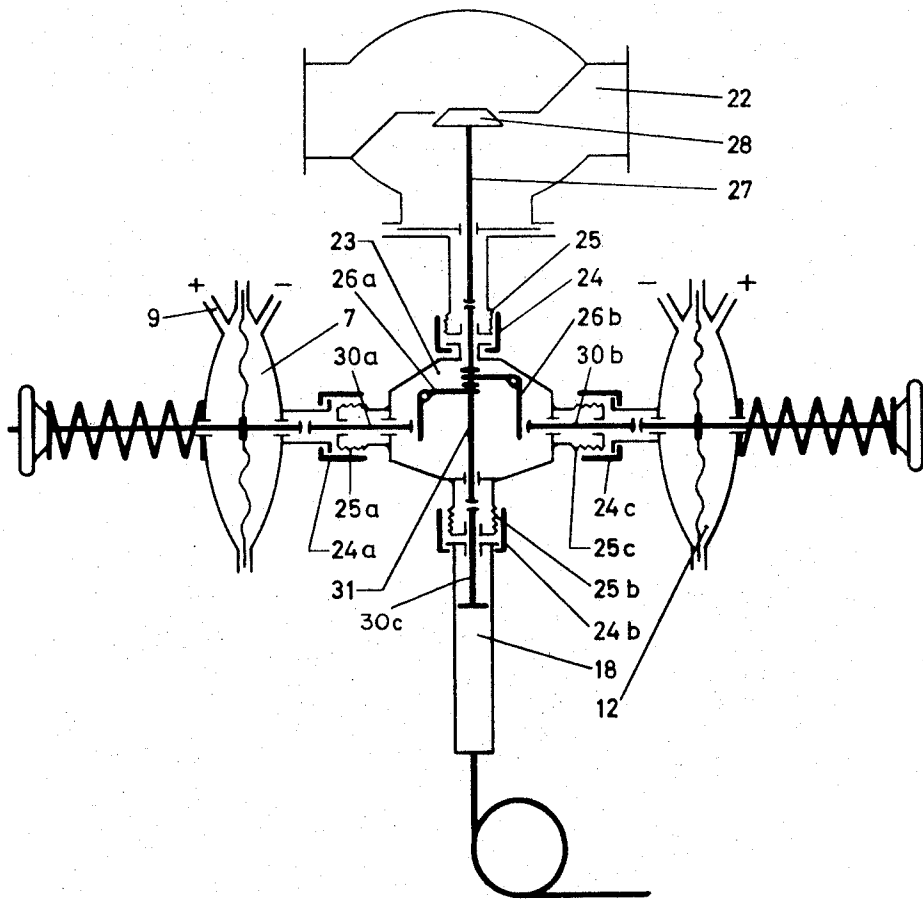


Fig. 3

1

3,479,003

ARRANGEMENT FOR AN AUTOMATIC ADJUSTMENT OF PHYSICAL VALUES

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6 Claims

ABSTRACT OF THE DISCLOSURE

A combination fixture having a single housing provided with four adjusting members of which one is adjusted by the other three within predetermined limits for adjusting the temperature, pressure and quantity of a streaming fluid medium. The adjusting member adjusted by the other three comprises a shaft which extends slidably outwardly of the housing for actuating a valve in a pipe through which flows said fluid medium.

The invention relates to an arrangement for an automatic adjustment of physical values as, for instance, pressure values, temperature values, quantity values or the like, which by the employment of adjusting members, constructed as throttling parts, are actuated by means, such as gas, steam or liquid.

It is well known to arrange pressure regulators, temperature regulators, quantity regulators and the like in pipe lines for gases, steam and liquids, in order to regulate the physical values of these media. Up to this time, it was customary to perform the individual adjustment procedures by means of locally separated adjustment members, such as valves, arranged in the pipe lines.

It is an object of the invention to provide for a concentration of all of these adjustments a simple and easily supervisable mechanical adjustment arrangement. For this purpose the invention provides a combination fixture for combining the different adjustment procedures and for connecting this fixture with a single adjusting member. The combination fixture combines, for instance a temperature-pressure regulation, a pressure-quantity regulation, a temperature-safety regulation or the like. According to another object of the invention, the combination fixture is connected with the single adjusting member, which may comprise a throttling member, such as a throttling cone, by means of a shaft, whereby this combination fixture is arranged after this single adjusting member in order to control its operation. In view of the novel combination fixture of the invention, it is no longer necessary as heretofore to employ a number of individual adjusting members since now a single adjusting member is employed for performing the different adjusting procedures.

In order that the combination fixture be able to perform all these different functions, it is provided with a number of movable transmission members which are connected directly or indirectly with the shaft or other linkage of the mentioned single adjusting member. These transmission members may have the form of angle levers, pins, shafts, gear wheels, gear racks, eccentrics or the like.

According to another object of the invention the combination fixture is provided with readily releasable connecting elements which may have the form of mechanically operable couplings. For the purpose of accomplishing the different adjusting procedures, the combination fixture is associated with at least two independently operable adjusting members provided with couplings which are connected with the couplings of the combination fixture. The couplings of the combination fixture and of

2

the adjusting members are constructed, for instance, in the form of screw caps with counterthread, cones with countercones, seals, bayonet joints or the like.

According to another object of the invention, the combination fixture serves as connecting device between the different adjusting members which perform the different adjusting procedures and the single adjusting member. In view of this arrangement of the combination fixture, each one of the different adjusting procedures is transferred to a single main adjusting member.

With these and other objects in view, the invention will now be described with reference to the accompanying drawing, in which

FIG. 1 illustrates diagrammatically an arrangement of the prior art in which each one of the several adjustments is performed by a separate adjusting member all of which are arranged in the same pipe line which supplies gas, steam or liquid to a consumer;

FIG. 2 illustrates diagrammatically an arrangement for the automatic adjustment of physical values in accordance with the invention; and

FIG. 3 illustrates in an enlarged scale the combination fixture of the invention with its associated adjusting members.

Referring firstly to the FIG. 1, which illustrates an arrangement of the prior art, it is well known that the pressure in a long-distance supply pipe 1 is substantially higher than the supply pressure 3 and the return pressure 4 of a heating installation in a building. Since it is generally customary to add long-distance heating supply water directly to the low-pressure building installation, it is necessary to reduce the pressure of the long-distance pipe line. In this connection, the reduced pressure is insignificant and has to be maintained within permissible limits to suit the pressure in the supply line for the building. For this purpose is generally employed a pressure relief device 5 comprising an adjusting member 6, a regulating member 7, a device 8 which adjusts the pressure to the desired value and a control pipe 9. The long-distance return pipe line is designated with 2.

In order that the long-distance heat, which is available to supply a number of individual buildings, is uniformly distributed, whereby at the same time care is taken that larger building complexes do not take away the peak demands of other buildings, it is required to limit the maximum heat which an individual building can take away from the main supply of heat. For this purpose is provided a quantity regulator 10 which comprises an adjusting member 11, a pressure-difference regulator 12, a device 13 which regulates the desired value, a restrictor 14 and control pipes 15.

Since in a building installation the temperature of the supply of hot water has to be maintained under due consideration of the weather conditions, it is customary to add to the hot water which circulates in the building pipes a certain amount of long-distance hot water depending upon requirements. For this purpose is employed an admixture regulator 16 which consists of an adjusting member 17, a servomotor 18, a supply temperature detector 19 and a detector 20 for the atmospheric temperature outside the building. The circulation in the building installation is supported by a pump 21, which at the same time produces the required pressure, in order that during a throttling position of the adjusting member 17 an amount of return water is added to the supply water.

This known arrangement has the disadvantage that for each adjusting procedure one individual adjusting member has to be provided. Since now the individual adjusting members are arranged in certain distances from each other, it is obvious that the entire arrangement is complicated and difficult to follow.

The arrangement of the present invention, however, overcomes these disadvantages of the prior art arrangement just described. In place of the arrangement of the prior art as illustrated in FIG. 1 and in which at least three adjusting members 6, 11 and 17 are required, the present invention, as it is illustrated in the FIGS. 2 and 3, provides only a single adjustment member 22 in the supply pipe 1 of the long-distance heating source. This single adjustment member 22 is connected with and is controlled by a combination fixture 23 connected with additional adjustment members 7, 12 and 18, 19 and 20. In this manner the adjustment members 7, 12 and 18 to 20 by means of the combination fixture 23 are used to control the throttle operation of the adjustment member 22.

Referring now to FIG. 3, the combination fixture comprising a housing 23 is connected by means of a coupling 24, which for instance may have the form of a screw cap, a bayonet joint or the like, with another coupling element 25 which may have the form of a counterthread, with the adjustment member 22. For the purpose of receiving the couplings 24a, 24b and 24c of the adjustment members 7, 12 and 18 respectively, of which the last-named member 18 is a servomotor which is associated with the supply temperature detector 19 and the outer temperature detector 20 the combination fixture 23 is provided with countercoupling members 25a, 25b and 25c. The coupling members 24a, 24b and 24c are constructed as screw caps, while the cooperating coupling members 25a, 25b and 25c all are constructed as counterthread, but cone and countercone, seals and counterseals and bayonet locks may also be provided at these points. Within the combination fixture 23 are arranged a number of individual adjusting members, or movable transmission members which by way of example may be constructed in the form of angle levers 26a, 26b, pins 30a, 30b, 30c and a shaft 31. The adjustment members 7, 12 and 18 engage the adjusting members or transmission members 26a, 26b, 30a, 30b and 30c, and the latter in turn are connected with a shaft 27 of the adjustment member 22. While in connection with the adjustment members 7 and 12 the pins 30a and 30b with the angle levers 26a and 26b establish an indirect connection with the shaft 27 of the adjustment member 22, it will be noted that the adjusting member 18 is connected directly by means of the pin 30c and the shaft 31 with the shaft 27 at the upper end of which a throttle member is arranged, namely a throttle cone 28. The adjustment members 7, 12 and 18 are arranged in such a manner that their associated adjustment members have with respect to one another sufficient play, so that each adjusting member independently of the other is able to move the throttle cone 28 to its closed position.

The alternate action of the individual adjustment members and the precedence position of the most important adjusting procedure at any one time is substantially as follows:

It is assumed that the pressure in the long-distance supply pipe 1 increases beyond the permissible maximum limit of the building installation. In that event the adjustment member 7 receives from the control pipe 9 a corresponding impulse and throttles by means of the pin 30a, the angle lever 26a and the shaft 31, the throttle cone 28 until the desired pressure has been obtained. If, however, at the same time the building has been cooled down so that this particular building connection requires much heat, then the supply temperature detector 19 makes the attempt to open the throttle cone 28 by means of the servomotor 18. Since, however, for safety reasons the maintenance of the pressure in the building installation takes precedence, the servomotor 18 will not be able to open the throttle cone 28.

When, for instance, as a result of a substantial heat requirement the supply temperature detector 19 should completely open the throttle cone 28 with the assistance

of the servomotor 18, then it may happen that the peak demand of the long-distance heat supply becomes too great. The result is that the connections to auxiliary buildings will not receive sufficient heat. For this reason a limit to the maximum heat supply is required which is taken care of by the differential pressure regulator 12. The amount of heat is measured, for instance, by the restrictor 14 which transfers its pressure difference on both sides to the diaphragm of the differential pressure regulator 12. During normal operation, which always lies below the peak load, the differential pressure regulator 12 is out of operation. When the predetermined peak heat is exceeded, then the differential pressure regulator 12 closes by means of the pin 30b, the angle lever 26b and the shaft 31, and the shaft 27 the throttle cone 28. From the foregoing, it is apparent that independent of the peak demand of heat the predetermined and permissible maximum amount is not exceeded. In this instance, the quantity limitation operates with priority independently of the pressure regulation and independently of the temperature regulation.

The invention is not limited to this embodiment described by way of example because there are other modifications possible. It would, for instance, be possible to connect two or even more combination fixtures with each other, so that in view of the number of adjusting members, which are coupled with these combination fixtures, the number of the adjusting procedures are increased. Therefore, with the assistance of the combination fixture in combination with a carefully designed building system, a subsequent change, expansion or supplement of the adjusting arrangement is possible.

What I claim is:

1. An arrangement for the automatic adjustment of physical values, such as pressure, quantity of a fluid medium, and temperature including a plurality of different adjustment means (7, 12, 18-20, 22) adapted to be actuated by different fluid media, said arrangement including a combination fixture comprising a housing, a plurality of adjusting members (30a, 30b, 30c, 31), coupling means (24, 24a, 24b, 24c) for connecting each one of said plurality of adjusting members (30a, 30b, 30c, 31) axially movable to said housing, one (31) of said adjusting members being arranged to be adjusted by any one of said other adjusting members for controlling one (22) of said different adjustment means, mechanical coupling means (26a, 26b) between some of said other adjusting members (30a, 30b) and said one adjusting member (31) and direct contact means between the other adjusting member (30c) and said one adjusting member (31) for adjusting said one adjusting member (31) in response to any one of the other of said different adjustment means, said other different adjustment means comprising a pressure responsive means, a servomotor, and a differential pressure regulator, respectively, said other adjustment members when operated by said other different adjustment means being moved in loose abutting relation with said mechanical coupling means and direct contact means to operate independently of each other said one adjusting member (31) and the one adjustment means (22) associated therewith.

2. An arrangement according to claim 1, in which said one adjusting member is connected with a valve arranged in a fluid medium supplyline, said valve being provided with a throttling member controlling said supply line, said one adjusting member comprising a shaft connecting said throttling member with said housing, said shaft extending slidably into said housing through one of said coupling means (24).

3. An arrangement according to claim 1, in which said one adjusting member is connected with a valve arranged in a fluid medium supply line, said valve being provided with a throttling member controlling said supply line, said one adjusting member comprising a shaft connecting said throttling member with said housing,

5

said shaft extending slidably into said housing, and within said housing being operatively connected with said mechanical coupling means which are in abutting relation with said other adjusting members.

4. An arrangement according to claim 1, in which said mechanical coupling means comprise angle levers pivoted within said housing at their apices and loosely abutting with their one leg said adjusting members.

5. An arrangement according to claim 1, in which said coupling means comprise readily releasable connecting elements for connecting each one of said different adjusting member (30a, 30b, 30c, 31) to said housing.

6. An arrangement according to claim 1, in which said one of said different adjustment means comprises a single valve having a movable throttling member (28) therein, a shaft on which said throttling member is mounted, said shaft extending slidably into said housing of said combination fixture, said mechanical coupling means operatively connecting said other adjusting mem-

6

bers with said shaft in such a manner that upon actuation of one of said other different adjustment means the mechanical coupling means associated with the other adjusting members cooperate with the mechanical coupling member of the actuated adjustment means for transmitting an adjusting motion to said throttling member.

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