E. J. DEEGAN.

DAMPER REGULATOR.

APPLICATION FILED DEC. 10, 1910.

989,128.

Patented Apr. 11, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

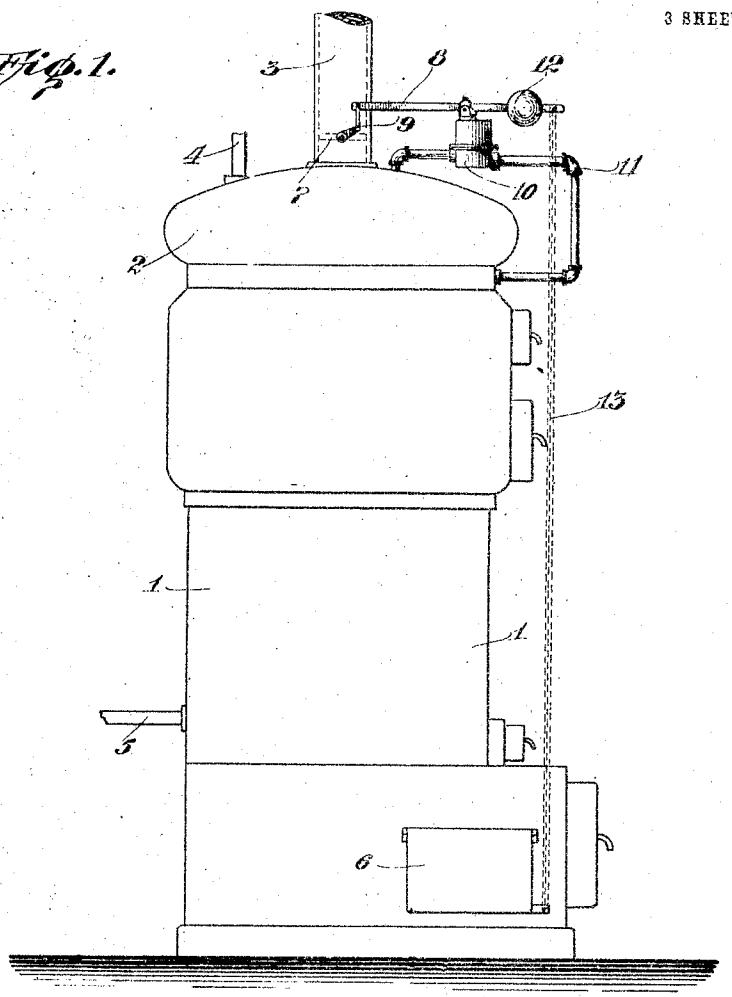
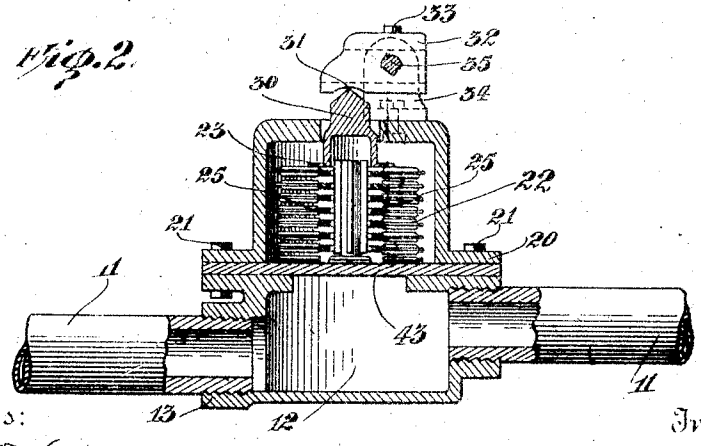


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

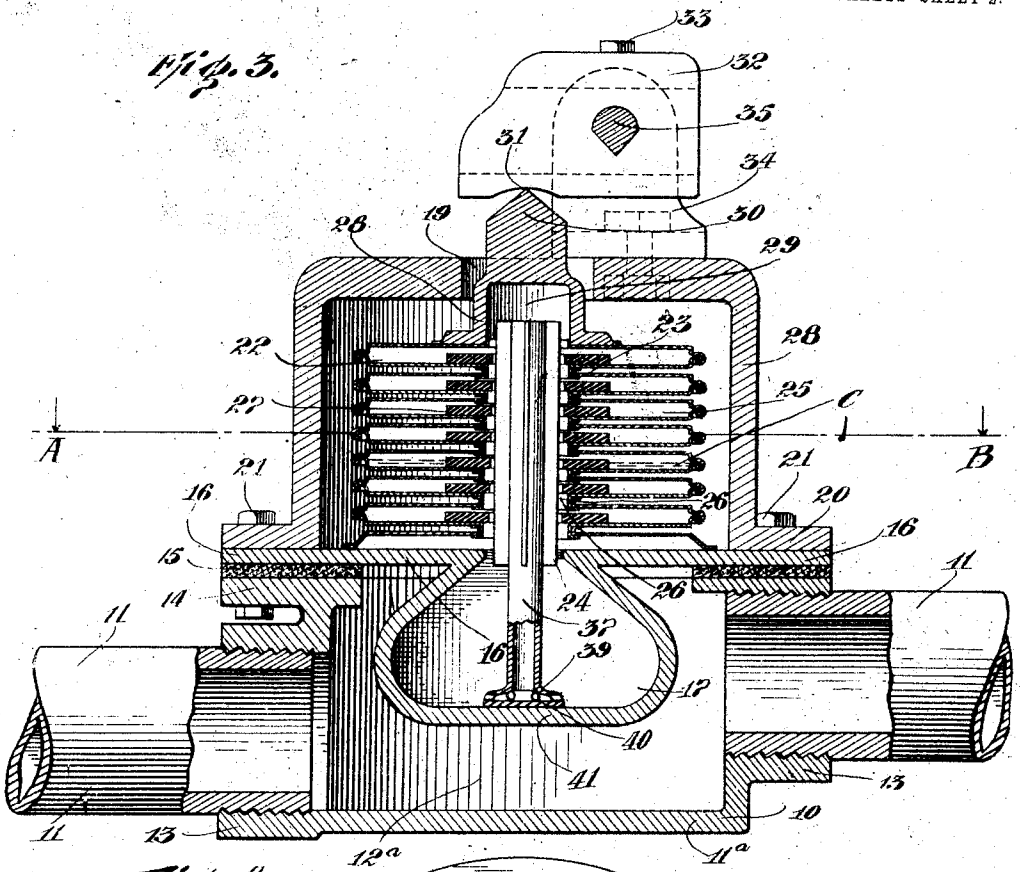
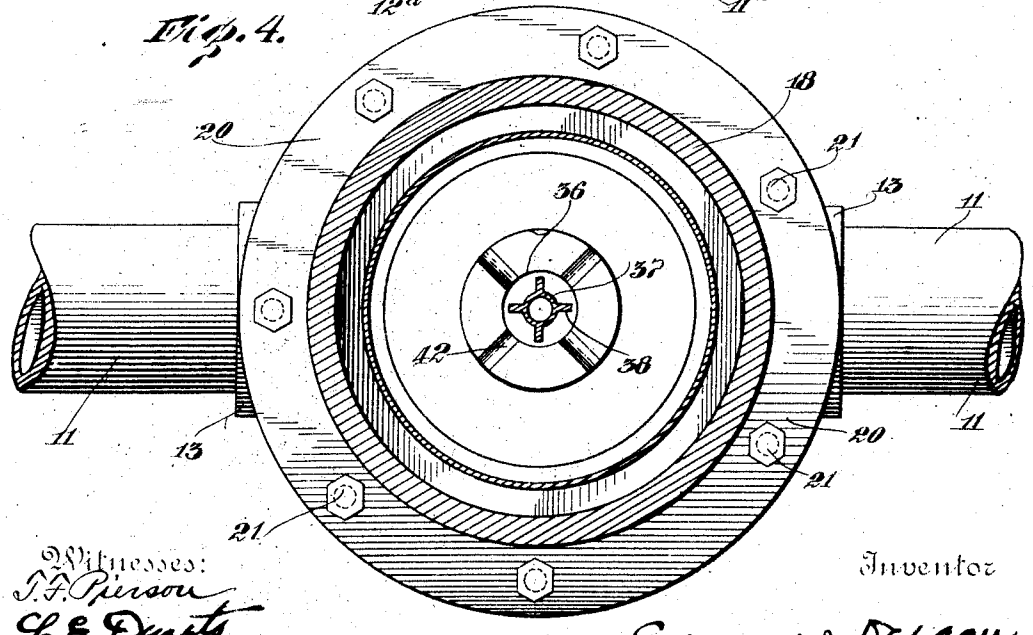


Fig. 4.



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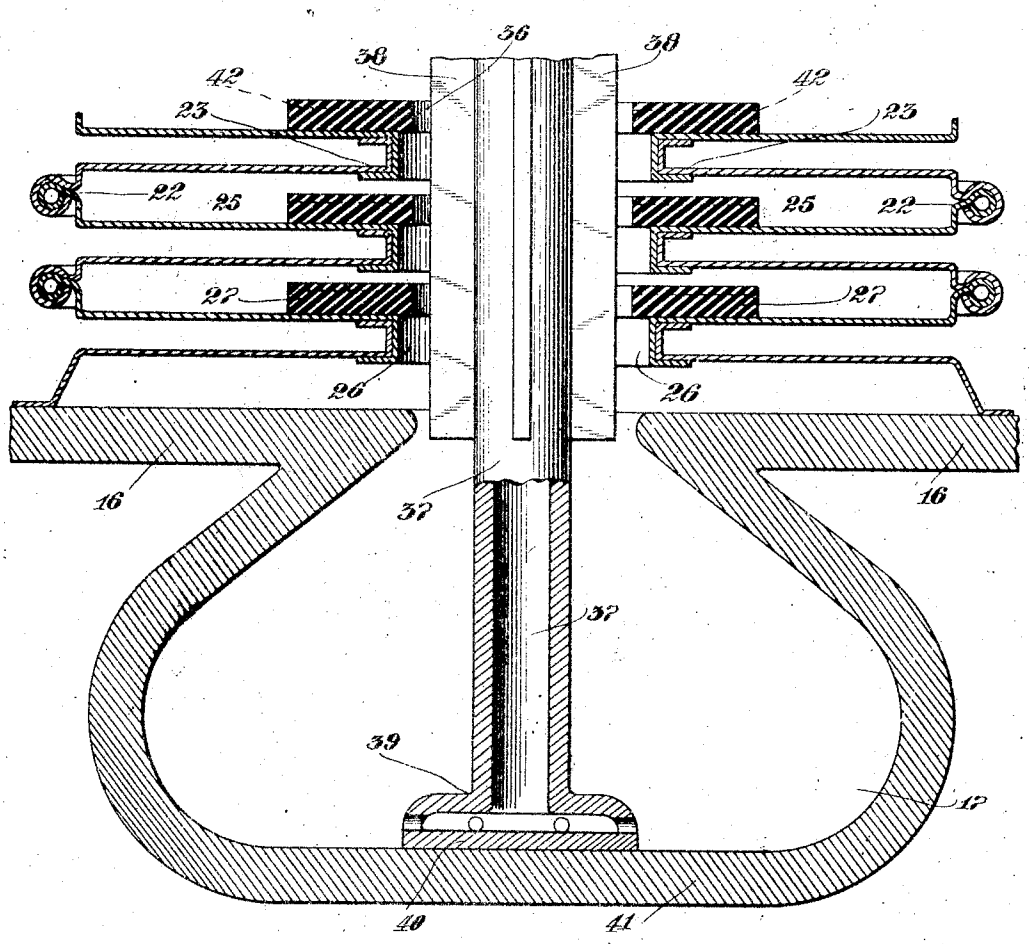
3 SHEETS—SHEET 3.

Fig. 5.



Witnesses

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EDWARD J. DEEGAN, OF NEW YORK, N. Y.

DAMPER-REGULATOR.

989,128. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed December 10, 1910. Serial No. 596,598.

To all whom it may concern:

Be it known that I, EDWARD J. DEEGAN, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Damper-Regulators, of which the following is a specification.

The invention relates to improvements in damper regulators for utility in connection with fluid heating systems of diverse natures such as steam, vapor and hot water heating systems.

The object of the invention is the providing of a damper regulator having associated therewith a primary expansible means comprising a plurality of independent expansible diaphragms, each of said independent diaphragms having associated therewith a secondary expansible means comprising a series of disks of an expansible material placed with such relation to said primary expansible means that the action on the secondary expansible means acts upon the primary expansible means in such a manner that elements depending thereon receive a compound movement under expansion.

Matter not shown, described, or claimed herein but referred to for the purpose of illustration is reserved, being described, shown and claimed in applicant's co-pending application Serial No. 595586 filed the 5th day of December, 1910, for improvements in damper regulators.

In the following is described in connection with the accompanying drawings one embodiment of the invention the features thereof being more particularly pointed out hereinafter in the claims.

In the drawings,—Figure 1 illustrates the damper regulator as applied to a fluid heating generator, the operative parts thereof being shown diagrammatically for the purposes of illustration; Fig. 2 is a vertical sectional view partly in elevation of a modified form of the damper regulator expansible controlling supporting means; Fig. 3 is an enlarged vertical sectional view of the preferred form of damper regulator; Fig. 4 is a cross sectional view on the line A—B of Fig. 3; and Fig. 5 is an enlarged detail sectional view of the primary and secondary expansible mechanism.

Similar numerals of reference indicate similar parts throughout the several views.

Referring to the drawings, 1 indicates a fluid generator or boiler provided with fluid heating dome 2, the well known type of draft-pipe 3, flow or fluid supply pipe 4 leading to the means of radiation (said radiation is not shown herein as it forms no essential part of the invention) and return pipe 5 and damper door 6 and the well known forms of fuel supply doors and ash-pit doors. Draft-pipe 3 has mounted therein a damper shutter 7 connecting with damper regulator lever 8 by means of bell crank 9. Damper regulator lever 8 is pivotally mounted on damper regulator 10 which is mounted in pipe line 11 which connects with heating or circulating dome 2. The outer exterior end of damper regulator lever 8 has mounted thereon a weight controlling means 12 and at its extreme end a chain 13 connecting with suitable fastening means on damper regulator 6. Regulator 10 described as being mounted in pipe line 11 is placed in the manner as shown in the drawings with relation to the system so that it receives its full head of generated fluids under pressure from the fluid generator, the manner of piping thereof forming a complete circuit for the fluids under pressure.

Damper regulator 10 comprises a base casing 11^a having a central fluid chamber 12^a the body of the casing thereof being provided with bosses 13^a externally threaded to receive the end connections of circulating pipe 11. Base 11^a has formed therewith a flange 14 which in turn has mounted thereon a strip of packing 15, if desired, which in turn has mounted thereon a plate 16 having cast therewith a bulb or chamber 17 the object of which is hereinafter described.

18 indicates the casing or hood of the damper regulator which is provided at its upper end with an aperture 19. The lower portion of said hood 18 is provided with a flange 20 adapted to engage a plate 16 and to be fastened to flange 14 and held rigidly thereto by means of bolts 21.

22 indicates a plurality of independent expansible metallic diaphragms, the lower member of each of the independent diaphragms being fastened together by any suitable means such as by a sleeve 23 and thereafter

suitably soldered, the extreme lower diaphragm 22 being rigidly fastened to plate 16 at the edge of the opening 24 and into bulb or chamber 17. The inner recesses 25 of each of the independent metallic diaphragms are in communication with each other and at a point spanning the opening or passage between each passage 26. Each of said expansible members 22 have mounted therein a disk 27 of an expansible substance such as hard rubber, etc., the uppermost expansible diaphragm having rigidly fastened thereto a cap 28 provided with a fluid chamber 29 the upper body portion of said cap 28 being tapered to form a projecting pin 30 which engages a recess 31 on damper regulator lever 8 and supporting head 32 provided with a set screw 33 and pivotally supported in bracket 34 on diamond bearing 35. Set screw 33 provides a means of adjusting said damper regulator lever 8 with relation to the amount of travel desired in opening and closing damper 6 and draft damper 7. Each of the expansible members 27 is provided with central apertures 36 and positioned a suitable distance away from central supporting and circulating post 37 which has mounted therein a plurality of wings 38 supplying a means permitting a free circulation of the fluids contained in bulb 17 and the expansible means, said supporting and circulating post 37 having formed on its lower end a supporting head 39 provided with fluid apertures 40 and adapted to rest upon the lower wall 41 of bulb or chamber 17. The bulb or chamber 17 and a predetermined number of independent metallic expansible diaphragms are filled solid with alcohol up to substantially the level as indicated at C, the object thereof being to provide a volatile fluid that will readily expand under an ordinary low temperature of fluid expansion and furthermore supplying an expansible controlling means having associated with it a primary and secondary expansible mechanism co-acting with each other in such a manner that the position of the dampers as associated with a fluid generator to be more positively controlled thereby lessening the possibility of an insufficient thrust of the damper regulator controlling means to operate the associated parts of a fluid generator to perform the desired functions. The plurality of disks 27 are placed within each of the independent metallic expansible diaphragms in such a manner that they rest upon the bottoms of each of said diaphragms 22 the upper surfaces of disks 27 being provided with grooves 42 permitting of a free circulation and passage of the volatile liquids from bulb 17 through circulating and supporting post 37 out at the top thereof into fluid chamber 29 contacting and impinging itself upon both the primary and secondary expansible means in a manner that the relative actions thereof are as one and furthermore permitting the circulating fluids to return to the volatile fluid supply chamber or bulb 17.

With reference to Fig. 2 of the drawings the structure as embodied therein is substantially the same as that illustrated in the remaining figures of the drawings, excepting that volatile fluid chamber or bulb 17 is obviated providing a closing disk 43 to which the expansible mechanism is attached. The structure as shown in Fig. 2 of the drawings supplies a damper regulator applicable for use in connection with water, steam and vapor systems of heating.

The operation of the device is as follows:—During the generation of a head of fluid under expansion within the fluid heating generator and throughout the means of radiation a perfect circulation of fluids under pressure and under increasing degrees of expansion is obtained through pipe 11 whence the fluids are caused to circulate in chamber 12^a and act upon the chamber or bulb 17 and thereby heat the volatile fluids as contained therein and cause said fluids to expand through aperture 24 into the chambers 25 of each of the independent expansible metallic diaphragms 22 and against each of the disks 27 permitting at the same time a complete circulation of the volatile fluids during expansion within said chambers 25 and thereby cause the gradual expansion of each and all of said independent metallic expansible diaphragms and said disks thereby causing cap 28 to be moved vertically through aperture 19 in hood 18 and act upon supporting head 32 carrying damper regulator lever 8, thus actuating the damper apparatus as desired. When the fluids under pressure have expanded and reached a predetermined degree of expansion they act upon the volatile fluids in the expansible mechanism and lift the weighted end of damper regulator lever 8 vertically upwardly closing damper 6 and also closing shutter 7 to decrease the head of fluids under expansion in the fluid generator and throughout a suitable means of radiation connected with said generator, the damper regulator described herein supplying an automatic controlling means applicable for use in connection with steam, vapor and hot water systems of heating. The damper regulator as herein shown and described is particularly applicable for use in connection with hot water systems of heating as the degree of expansion is rather low and an element that will expand in the lower degrees of pressure is a desired feature, one, as a matter of fact, that has never heretofore been successfully operated. The volatile fluids act upon the heating fluids under pressure in connection with the compound or primary and secondary expansible

means render the damper regulator as herein shown and described one that is not only applicable to hot water systems but one that may be readily applied to varied systems of heating.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A device of the character described including supporting means provided with a fluid chamber, a fluid pipe reception means, an auxiliary housing therefor, a volatile fluid chamber mounted on said supporting means, an expansible means comprising a primary expansible chamber consisting of a plurality of expansible disks, and a secondary expansible means consisting of a plurality of expansible disks mounted in said primary expansible means said secondary expansible means having formed therein communicating passageways to permit the flow of the volatile fluids from said volatile fluid chamber into the interior recesses of said primary expansible means.

2. A device of the character described comprising a supporting body provided with a fluid chamber and fluid pipe reception means, a separate fluid chamber mounted thereon, a hood mounted on said separate fluid chamber engaging said supporting means and provided with an aperture at its top, a primary expansible means mounted in said hood on said separate fluid chamber, a cap mounted thereon projecting through the aperture in said hood, a plurality of expansible disks mounted in said primary expansible means, a circulating post mounted in said separate fluid chamber forming a means of communication between said chamber and the interior recesses of said primary expansible means, and a damper regulator lever supporting means mounted on said hood adjacent to said cap on said primary expansible means.

3. A device of the character described including a supporting means provided with a fluid chamber and fluid pipe reception means, an auxiliary chamber mounted in the fluid chamber in said supporting means, means for supporting said auxiliary chamber on said supporting means, a hood provided with means engaging the supporting means for said auxiliary chamber, having an aperture at its top thereof, a primary expansible means mounted in said hood and on the supporting means for said auxiliary fluid chamber comprising a plurality of independent sheet metal diaphragms all of which communicate with one another, a secondary expansible means comprising a plurality of independent disks of expansible material mounted in each of said independent metallic expansible diaphragms, a circulating post mounted in said auxiliary chamber provided with means adapted to permit a circulation between the interior recess of the auxiliary chamber and each of the chambers formed in each of the independent metallic expansible diaphragms, a cap mounted on the uppermost independent diaphragm projecting through the aperture in said hood, a bracket mounted on said hood, a damper regulator supporting head pivotally mounted in said bracket and engaging the pin formed on said cap, and means mounted in said lever supporting means permitting of the adjustment of said lever.

4. A device of the character described including an expansible mechanism for damper regulators comprising a fluid heating chamber, an auxiliary fluid chamber mounted on said fluid heating means and depending therein, a hood mounted on said auxiliary fluid chamber supporting means provided with an aperture at its top, a primary expansible means comprising a plurality of independent metallic expansible diaphragms provided with apertures forming a means of communication between one another the lower one thereof communicating with the auxiliary fluid chamber, a secondary expansible means mounted in each of said independent metallic expansible diaphragms, a circulating post mounted in said auxiliary fluid chamber adapted to permit of the circulation of a volatile fluid therethrough into each of the chambers in the independent metallic expansible means, the uppermost expansible metallic diaphragm having mounted thereon a cap provided with a circulating chamber and having formed therewith a projecting pin adapted to engage a damper regulator lever.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EDWARD J. DEEGAN.

Witnesses:
LAURA E. SMITH,
SADIE SEMLEAR.