I. TCHERNIAKOFSKY.

TRIPLE REGULATION COCK FOR LOW PRESSURE HEATING SYSTEMS.

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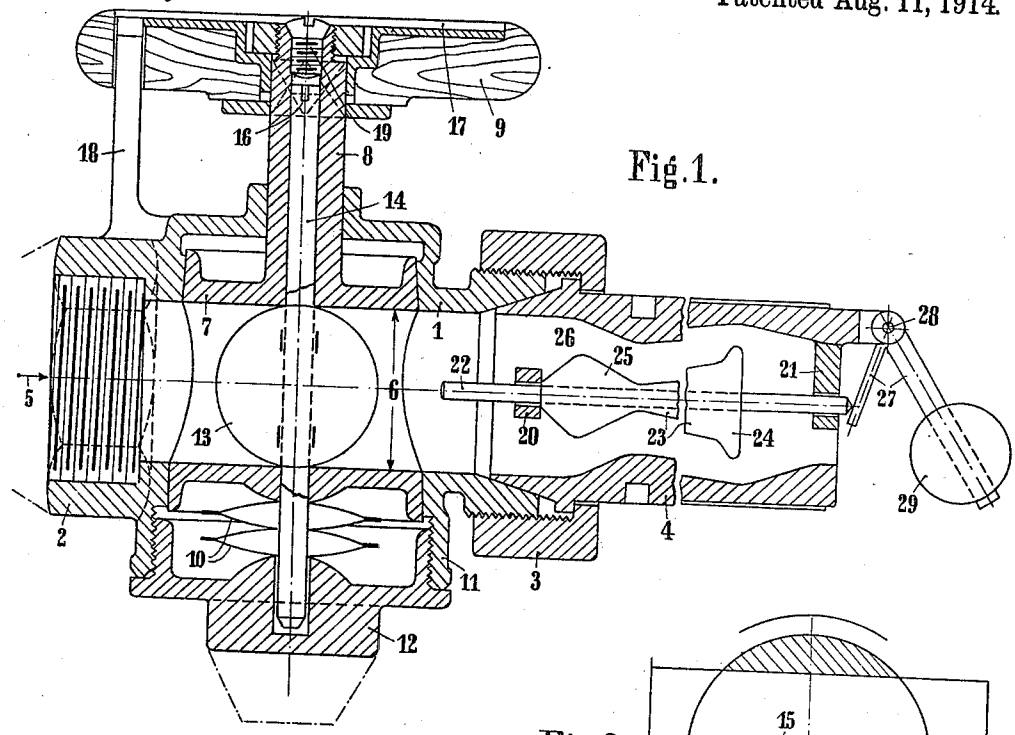


Fig. 1.

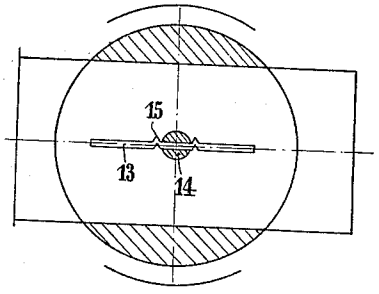


Fig. 2.

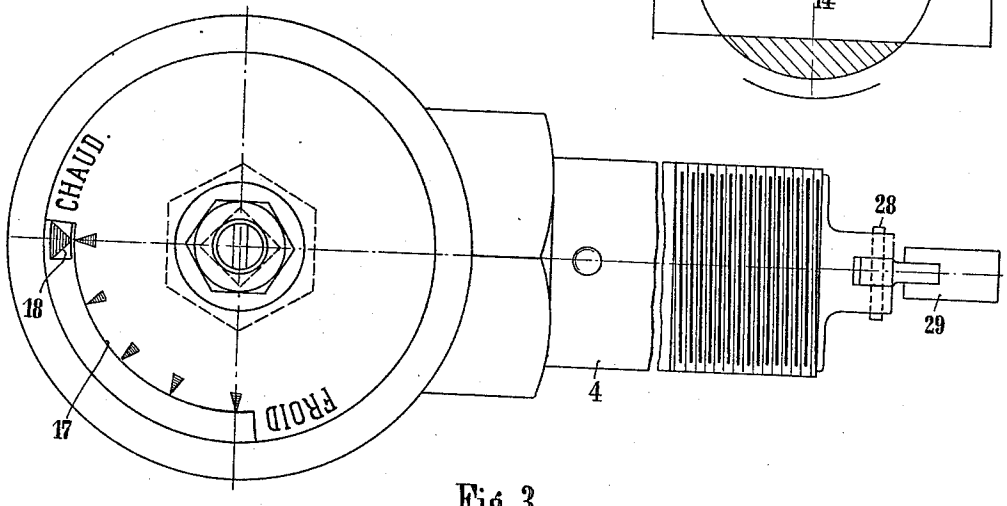


Fig. 3.

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TRIPLE-REGULATION COCK FOR LOW-PRESSURE HEATING SYSTEMS.

1,106,594. Specification of Letters Patent. Patented Aug. 11, 1914.

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To all whom it may concern:

Be it known that I, ITZKO TCHERNIAKOFSKY, a subject of the Czar of Russia, residing at Lille, France, have invented new and useful Improvements in Triple-Regulating Cocks for Low-Pressure Heating Systems, of which the following is a specification.

It is the object of my invention to provide a triple regulation cock for low pressure steam heating systems, which in comparison with the known regulating cocks for low pressure steam heating plants has the advantage of providing a direct passage without any change in the direction of flow of the heating medium which change as is known, causes losses of energy and of heat and renders the primary adjustment difficult, and which known devices furthermore have the disadvantage that they never close perfectly tight because their vertical displacement requires the use of a cylindrical spigot which cannot be ground sufficiently to produce a permanent tight closure.

As it is well known, the flow of steam is dependent on the difference of pressure in front of and at the rear of the cock or valve, *i. e.* of the pressure of the steam and the counter-pressure in the radiator. Consequently, this difference of pressure must be constant in order to maintain the flow of a certain quantity of steam. However, the pressure in front of the cock will vary as soon as the other radiators are suitably adjusted and, the counterpressure varies, because its force in low pressure systems is generally determined by the prevailing atmospheric pressure and its value frequently by the height of the barometer for the time being.

A primary object of my invention is to provide a regulating cock which obviates all the above mentioned disadvantages and which presents all the advantages connected with the use of a cock, as compared with those of a valve.

My improved regulating cock substantially consist of a customary through-way cock having a special, throttling member, preferably formed as a disk arranged in the spigot, and having a freely axially displaceable throttling member, loaded if desired, and arranged in the tubular connection leading to the low pressure radiators, the latter throttling member being either under the influence of the free atmosphere or under the influence of the flow of the steam.

One illustrative embodiment of my invention is represented by way of example in the accompanying drawing, wherein:—

Figure 1 is a vertical section, Fig. 2 a horizontal section through the spigot and box of the cock, and Fig. 3 is a top plan view.

Referring to the drawing, 1 designates the well known box having a branch 2 for the attachment of the low pressure steam pipe and the connecting branch 4, if desired specially connected with the box by means of the screw-cap 3 leading to the radiator. The heating medium flows through the cock in the direction of the arrow 5 without varying its direction.

The free section of passage 6 in the box can be throttled by the spigot 7. The spigot 7 is not, as is otherwise customary, inserted with the tapered part of the cone downward in the box, but reversely in such manner that when the spigot is adjusted by means of the hand wheel 9 placed on the prolongated hub 8 of the same, the spigot is relieved by the pressure by hand, so that it is possible readily to turn it, while after it has been adjusted it is again pressed by the full force of the springs against its seat. A spiral spring is not used as is customary, but preferably one or more diaphragm springs 10 which abut against the spigot and against a nut 12 screwed into a branch 11 of the box 1. Such diaphragm springs are to be preferred, especially when a very small stroke is necessary, because a considerable change in the pressure due to the springs is accompanied by a small deformation of the springs, and because the rotation of the spigot to and fro exercises no influence on the same.

The section of the passage through the spigot 7 alone can be throttled owing to the arrangement of a preferably circular, throttling disk 13 able to be rotated by a spindle 14 guided in the hub 8 of the spigot. This disk is preferably attached to the spindle by providing the lower end of the latter with a slot and making it fork-shaped and pushing it over the disk 13 guided in the hole in the spigot. The disk is secured in the axial direction of the bore of the cock by projections 15 stamped at the two sides of the spindle.

It is evident that by rotating the spindle 14 in the hub 8 the disk 13, which is also ro-

tated correspondingly, throttles the section of the spigot; a rotation of 90° suffices for throttling the full section down to zero. The spindle 14 is rotated in the hub 8 by inserting into a suitable incision 16 in the top end of the spindle a screw-driver which preferably is provided with a scale corresponding to the scale 17 of the hand wheel 9 movable over a pointer 18 secured on the box 1, in order to make the amount of the adjustment readily visible. The pointer 18 consequently enables the expert to accurately effect the primary adjustment of the cock by means of the disk 13 and also enables the person regulating the heat for the time being to correctly effect the adjustment of the spigot 7. The upper end of the hub 8 is preferably closed by a screw 19. Obviously, this cock can also be employed in hot water systems.

Constant difference of pressure in front of and behind the cock is possible owing to the insertion of a special throttling member 23 freely axially displaceable under the influence of the pressure and counter-pressure. This throttling member 23 is secured in the connecting branch 4 on a spindle 22 which is freely axially displaceable in the hubs 20 and 21, said member being formed at its upper end as a disk 24 and at its other or lower end as a cone 25 in such manner that the free section of passage 26 is more or less throttled according to the position of the member 23. When the cock is mounted horizontally the spindle 22 is under the influence of a load owing to its front end being pressed by the one arm of an angle lever 27, fulcrumed on a fixed pivot 28, the other arm of which carries a weight 29. Accordingly, the throttling member 23 is under the influence of, firstly, the pressure of the flow exercised on it by the heating medium flowing in the direction of the arrow 5, secondly, the load of the weight 29 and, thirdly, the free atmosphere acting on the side of the disk 24 turned away from the flow because the radiator itself is subjected to the pressure of the free atmosphere. The adjustment of the throttling member 23 thus depends on the relation between the pressure of flow, and of the free atmosphere and, in a given case, on the weight of the load. If the action of the free atmosphere varies, *i. e.* the height of the barometer changes, the adjustment of the throttling member 23 also changes, that is to say when the throttling member is suitably dimensioned, the quantity of the flowing heating medium is automatically regulated according to the height of the barometer.

I claim:—

1. A regulating cock for low pressure steam heating systems comprising in combination with the box having a smooth passage therethrough and a connecting branch connected therewith, a spigot rotatable in said passage, a circular throttling member movable in the spigot, a spindle to rotate said member, a double conical throttling member adapted to be displaced in axial direction within said branch, substantially as described.

2. A regulating cock for low pressure steam heating systems comprising in combination with the box having a smooth passage therethrough and a connecting branch connected therewith, a spigot rotatable in said passage, a circular throttling member movable in the spigot, a spindle to rotate said member, provided with a slot in its lower end, projections upon said circular throttling member entering the slot of said spindle for connecting both parts.

3. A regulating cock for low pressure steam heating systems comprising in combination with the box having a smooth passage therethrough and a connecting branch connected therewith, a spigot rotatable in said passage, a circular throttling member movable in the spigot at the outflow end, a double conical throttling member adapted to be displaced in axial direction within said branch at the inflow end for automatically regulating the throttling members in harmony with the changes in the pressure variations between steam and atmosphere.

4. A regulating cock for low pressure steam heating systems comprising in combination with the box having a smooth passage therethrough and a connecting branch connected therewith, a spigot rotatable in said passage, a circular throttling member movable in the spigot, a spindle to rotate said member, a double conical throttling member adapted to be displaced in axial direction with said branch, a weighted bell crank lever provided with adjustable weights for controlling the maximum pressure and influencing said throttling member, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

I. TCHERNIAKOFSKY.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."