No. 816,939. PATENTED APR. 3, 1906.

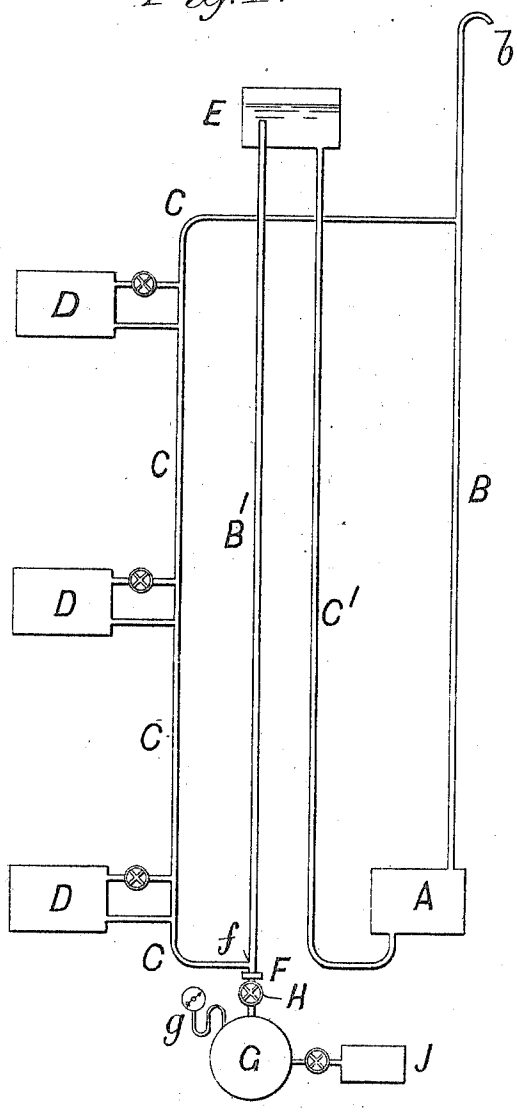
J. N. RUSSELL.

WATER CIRCULATING APPARATUS.

APPLICATION FILED OCT. 3, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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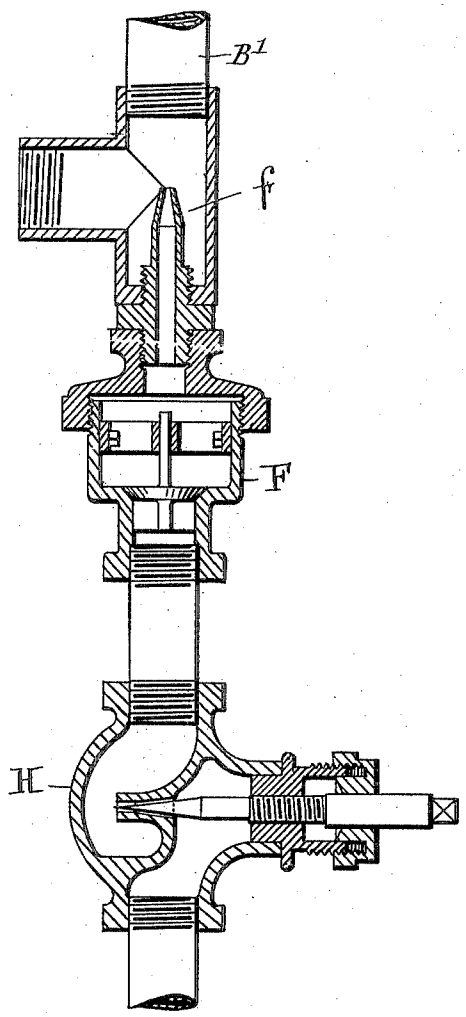
2 SHEETS—SHEET 2.

Fig. 2.



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JOSEPH NELSON RUSSELL, OF LONDON, ENGLAND.

WATER-CIRCULATING APPARATUS.

No. 816,939. Specification of Letters Patent. Patented April 3, 1906.

Application filed October 3, 1904. Serial No. 226,997.

To all whom it may concern:

Be it known that I, JOSEPH NELSON RUSSELL, engineer, a subject of the King of Great Britain, residing at 22 Charing Cross, Whitehall, London, England, have invented a Water-Circulating Apparatus, of which the following is a specification.

My invention relates to water-circulation apparatus such as is used for warming buildings, supplying hot-water draw-off taps, or for cooling storage-rooms and the like and wherein the warmer water ascends from the point where it takes up the heat—as, for example, the boiler or the apartment to be cooled—to a tank in the upper part of the building and descends thence through pipes and radiators or other apparatus in connection with which it is utilized or cooled, as the case may be, ultimately returning by gravitation to the starting-point. In such arrangements, more especially in cases where the head of water under which an installation is required to work is low or where the friction due to the movement of the water is considerable, difficulty is frequently experienced in inducing a flow of water through the ascension-pipe to the top tank at a rate sufficient to maintain a steady flow through the system of return-pipes, whereby the heated water reaches the radiators, draw-off taps, or coolers.

The object of my invention is to enable the difficulty to be overcome; and it consists in providing means whereby the return water does not return directly to the heater, but is forced up a secondary ascension-pipe (by an aerated column-pump or its equivalent) to an elevated tank, whereby a head of water is produced. From this tank water passes to the heater by a final return-pipe, in this way accelerating the natural circulation.

For the sake of convenience I will describe the invention as applied to hot-water-circulation apparatus for warming purposes, it being, however, understood that the invention is equally applicable for cooling purposes.

Figure 1 is a diagrammatic elevation showing a water system arranged according to my invention. Fig. 2 is a vertical section taken through certain valves and nozzles which constitute details of the piping arrangement.

In the accompanying drawings, wherein I have represented diagrammatically a typical example of hot-water-circulation apparatus and the application thereto of my invention, A represents the water-heater; B, the hot-water-ascension pipe, leading from A; C, the service or down pipe; D, the radiators, heating-coils, or other devices in or at which the hot water is used for heating or is drawn off, these devices D being connected to or branched upon the service-pipe C, as usual.

E represents the top tank, and *f* the connection or point whereat the air or equivalent gaseous fluid is introduced under pressure into the circulation.

The heater A delivers hot water through the ascension-pipe B (which may proceed from the upper part of the heater) and the service or return pipe C, to which latter pipe the radiators or draw-off taps D are connected. This pipe C is connected to the lower end of a secondary ascension-pipe B′, which delivers the water to the top tank E, whence the water returns to the heater A by way of the descending return-pipe C′. In the example illustrated the heater A is placed at or near the bottom level of the circulation system; but it might be placed higher, and steam or vapor is permitted to escape from the upper part of the ascension-pipe B to the atmosphere, as at *b*. The compressed air is introduced into the circulation system at the lower part of the secondary ascension-pipe B′, so as to pass directly therethrough to the top tank E, where the air finds freedom to escape from the water into the atmosphere. The air may be initially heated in any convenient manner, and it is admitted into the interior of the ascension-pipe from a reservoir G, wherein it is stored under sufficient pressure. The air-supply pipe would be provided with a non-return valve, as at F, and with a stop-valve, as at H, for regulating the supply, the air being delivered into the secondary ascension-pipe preferably through an upwardly-directed injection-nozzle of suitable construction.

The compressed-air reservoir G, which may be provided with a pressure-gage, as at *g*, may be supplied by means of an air pump or compressor J, which would usually be worked by hand at stated intervals—say once in twenty-four hours—to an extent sufficient to replenish the supply. The air-compressor might, however, be worked automatically—as, for example, by means of a small hydraulic or other motor arranged to come into operation on the air-pressure within the reservoir

falling below a predetermined limit and to cease working on the pressure rising above said limit, all in a well-known manner.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A water system comprising an ascension-pipe, a service-pipe connected thereto at an elevated point, a pair of auxiliary pipes communicating respectively with said first pipes near the lower portions thereof, and in communication above, and means for developing an upward current of gas in one of said auxiliary pipes.

2. A water system comprising an ascension-pipe, a service-pipe connected thereto at an elevated point, an elevated tank, a secondary ascension-pipe delivering to said tank and communicating with said service-pipe at the lower portion thereof, means for developing an upward current of gas in said secondary ascension-pipe, and a pipe leading down from said tank and communicating with said ascension-pipe at the lower portion thereof.

JOSEPH NELSON RUSSELL.

Witnesses
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