No. 869,434. PATENTED OCT. 29, 1907.

B. F. HERR.

ATTACHMENT FOR FURNACES.

APPLICATION FILED OCT. 29, 1906.

3 SHEETS—SHEET 1.

Fig. 2.

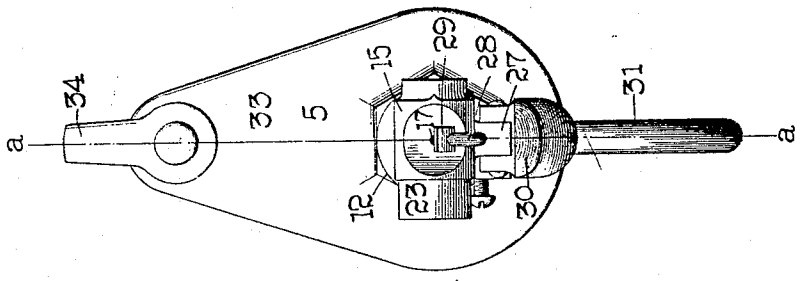
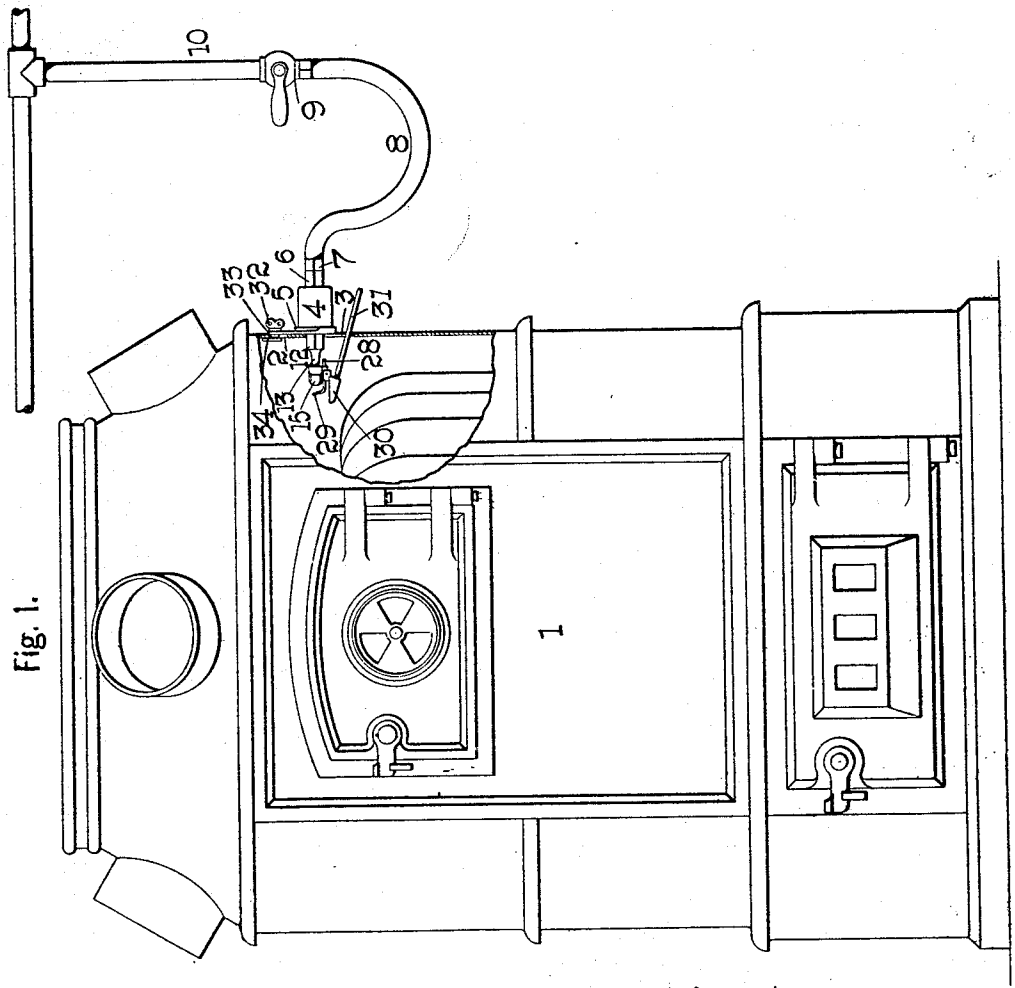


Fig. 1.



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126 STOVES & FURNACES.

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3 SHEETS—SHEET 2.

Fig. 9.

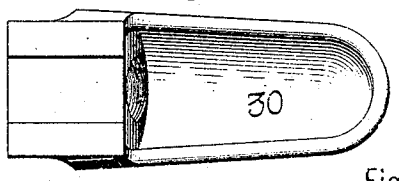


Fig. 3.

Fig. 8.

Fig. 11.

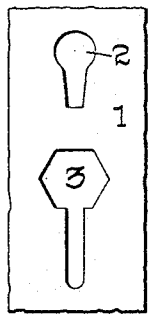


Fig. 7.

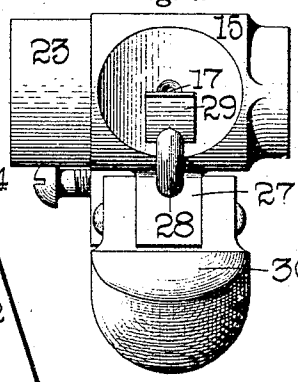


Fig. 6.

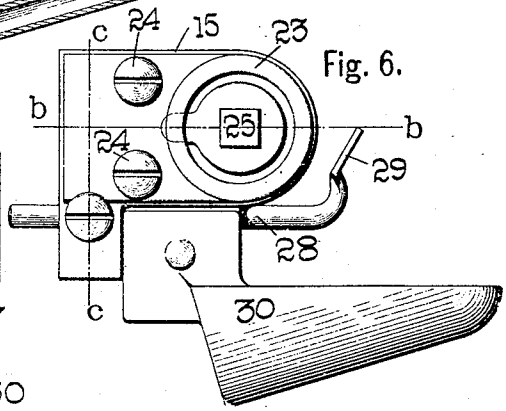


Fig. 4.

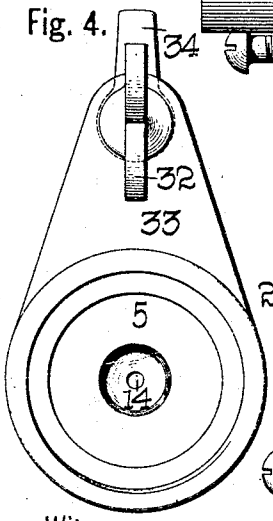


Fig. 10.

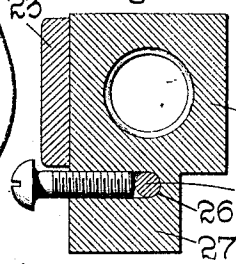
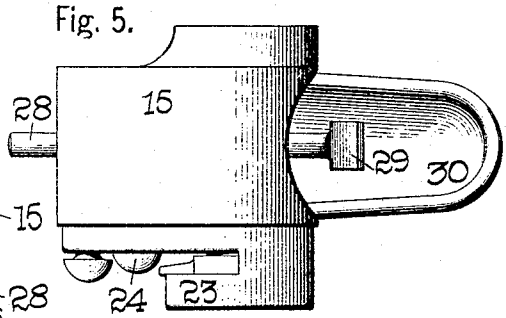


Fig. 5.



Witnesses.

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No. 869,434. PATENTED OCT. 29, 1907.

B. F. HERR.

ATTACHMENT FOR FURNACES.

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3 SHEETS—SHEET 3.

Fig. 12.

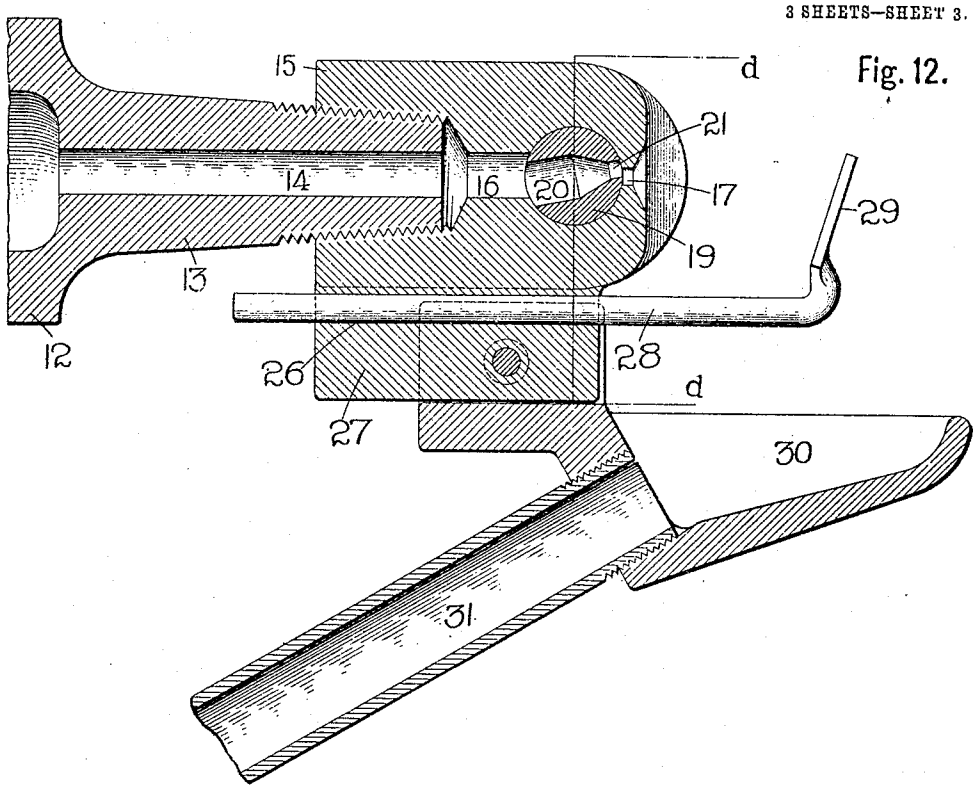


Fig. 13.

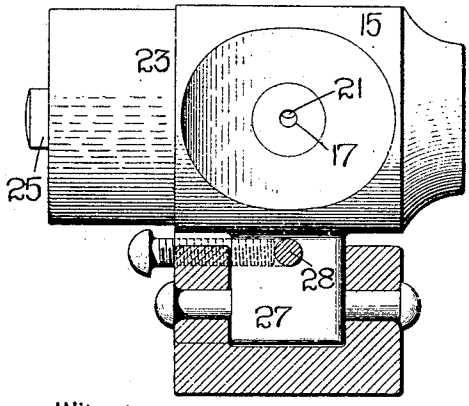
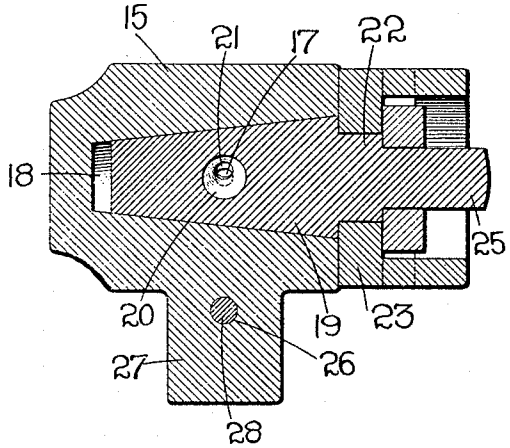


Fig. 14.



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UNITED STATES PATENT OFFICE.

BENJAMIN F. HERR, OF BUFFALO, NEW YORK.

ATTACHMENT FOR FURNACES.

No. 869,434. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed October 29, 1906. Serial No. 341,170.

To all whom it may concern:

Be it known that I, BENJAMIN F. HERR, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improvement in Attachments for Furnaces, of which the following is a specification.

This invention relates to an attachment for furnaces or the like and is designed to supply vapor to heated air in proper condition to combine with the heat units therein.

The object of the invention is to produce a device to be attached to furnaces or the like for the purpose of creating the desired proportion of relative humidity in artificially heated air.

The invention also relates to certain details of construction of the device, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings in which a preferred construction of the device is illustrated in detail and also attached in proper operating position to a furnace.

In the drawings,—Figure 1, represents a front elevation of a furnace equipped with my improved attachment, a portion of the furnace casing being broken away to show the attachment. Fig. 2, is an enlarged detached end elevation of my improved furnace attachment. Fig. 3, is a central longitudinal section through my improved attachment on line *a*—*a*, Fig. 2. Fig. 4, is a detached view of the screw cap. Fig. 5, is an enlarged detached plan view of the block. Fig. 6, is an enlarged detached side view of the block. Fig. 7, is an enlarged detached end view of the block. Fig. 8, is an enlarged fragmentary section on line *b*—*b*, Fig. 6, showing the valve in the block. Fig. 9, is a detached plan view of the drip cup. Fig. 10, is a transverse section on line *c*—*c*, Fig. 6. Fig. 11, is a fragmentary view of the furnace casing showing the openings therein through which the nozzle is introduced. Fig. 12 is a greatly enlarged central vertical longitudinal section through the improved attachment with the tapering valve plug turned to partially close the small outlet. Fig. 13 is a greatly enlarged front view of the attachment with the drip cup and spoon in section and the valve plug turned to partially close the outlet as in Fig. 12. Fig. 14 is a greatly enlarged transverse vertical section on line *d d*, Fig. 12.

In referring to the drawings for the details of construction like numerals designate like parts.

The invention comprises a device which can be attached to a furnace to supply vapor to the heated air in proper condition to combine with the heat units therein and thus increase the relative humidity in proportion to the heat. This is accomplished by introducing a very minute stream of water and breaking it up with a spoon or blade into a vapor sufficiently fine to combine with the heat.

While in Fig. 1, a furnace 1, of well known hot air type is illustrated, the device is equally adapted to be used in conjunction with various other styles of furnaces.

The side wall of the furnace is provided at suitable points with openings through which the nozzle of the device together with the drip cup, the drip cup pipe and the locking key, are inserted.

The opening 2, for the locking key is substantially of a pear shape form and is located above the opening 3, through which the nozzle and drip cup are inserted.

The device or attachment has a hollow casing 4, which is closed at one end by a screw cap 5, and is provided with a reduced tubular screw threaded portion 6, at the opposite extremity in which a tubular metal hose coupling 7, screws.

One end of a rubber hose 8, is fitted upon the coupling 7, and its opposite end is attached to a valved coupling 9, which is connected to a service water pipe 10, communicating with one of the water mains of a city or to any other pipe for supplying water under pressure.

The interior of the casing is filled with a filtering medium, such as a sponge or analogous material 11, which serves to remove the impurities from the water and also reduce the pressure.

The cap 5, is provided with a reduced central outwardly extending tubular portion 12, having a hexagonal or similar form for engagement with a suitable tool, such as a wrench, and is tapered at its outer end to form a nozzle 13.

The nozzle has an opening 14, extending throughout, which is greatly smaller than the opening in the tubular portion and a block 15, screwed upon the nozzle, has an opening 16, communicating with the opening in the nozzle and reduced sufficiently at its outer end to provide a very small outlet 17, through which a very fine stream can be projected. The preferable size of the outlet 17, in the block is about one thirty-second of an inch in diameter, although it may be made smaller or larger to suit the conditions.

A transverse tapering recess 18, is formed in the block 15 near its outer end, and a tapering valve plug 19, is rotatably fitted in said recess. The valve plug 19, is provided with a transverse opening 20, which, in part, is substantially the same size of, and is adapted to register with the opening 16, on one side; and is reduced at 21, on the opposite side to substantially the size of, and adapted to register with the outlet opening 17, see Fig. 8.

The opening 16, in the block 15, is sufficiently short to avoid the danger of capillary attraction, which would tend to deflect the stream and reduce its force; and the opening 20, in the valve plug 19, is tapered to about 60 degrees where it merges into the reduced opening 21, to prevent back pressure or counter currents as much as possible.

The outer extremity of the outlet opening 17, is

tapered to provide a bell mouth which will not interfere with the stream.

The valve plug is provided with a reduced portion 22, over which a plate 23, is fitted to hold the plug in the recess. The plate is fastened upon the exterior of one side of the block 15 by screws 24, or other suitable fastenings.

The upper extremity 25, of the plug is formed to constitute a head upon which a turning key can be fitted to rotatably adjust the plug.

In a longitudinal opening 26, cut in a reduced lateral extension 27, beneath the block proper, and preferably formed integral with the block, is slidably supported a rod 28, which carries, at its outer end a spoon or blade 29. This spoon or blade extends in the path of the stream from the nozzle outlet and serves to break the stream up into separated molecules of vapor which are minute enough to unite with the heat units in the artificially heated air.

A drip cup 30, is supported from the lateral extension of the nozzle beneath the spoon or blade 28, and catches any drip from said spoon. A pipe 31, extends from the drip cup or pan out through the furnace to any convenient locality.

While the purpose of the drip cup is to catch the surplus water, it is only necessary at intervals, as usually the device is adjusted so that all of the stream issuing from the nozzle is broken up fine enough to be taken up by the air.

The device is preferably fastened in place on the furnace by a locking key 32, which is rotatably supported by an extension 33, of the cap 5, and is fitted through the pear shaped opening 2, in the furnace wall and turned to bring its lateral locking lug 34, in contact with the interior of the furnace wall. In this device both the volume and pressure of the water are regulated by the tapered rotary valve in the block.

The operation of this device is as follows,—The device being attached to a furnace in the manner heretofore set forth or in an analogous way so that the nozzle will project into the furnace and being connected to a water supply pipe, the valve in the coupling 9, is turned to permit the water to flow into the casing. The volume of water issuing from the outlet is regulated by adjusting the tapering valve p'ug in the end of the nozzle so that only sufficient water will be projected to be completely combined with the air.

It has been found by experience that the best results are obtained when the tapering valve plug is turned to partially close the outlet leaving a substantially oval opening for the passage of the stream, substantially as shown in Figs. 12, 13 and 14.

When the valve plug is partially turned as in Fig. 12, a portion of the stream strikes the abrupt wall exposed at the top of the outlet and gives a twirling or twisting motion to the water tending to disrupt or break up the continuity of the stream particularly on its outer surface, and has the effect of forcing the stream against the breaking spoon in condition to be broken into its finest possible atoms for combination with the atmospheric heat.

The drip cup is only put on as a precautionary device to absolutely prevent any water dripping into the furnace and is only necessary at rare intervals when the device is not properly adjusted and the flow of water is greater than is required to produce sufficient molecules of vapor to completely combine with the air, thereby leaving a surplus of water which will drop into the furnace unless caught.

The fundamental principle of this device is founded upon the breaking of the stream into its smallest form, so that it will be minute enough to combine with the heat units in the atmosphere.

This improved attachment for producing relative humidity in artificially heated atmosphere is designed for connection to a furnace or any indirect heating system and may be changed or modified, without departing from the scope of my invention, sufficiently to enable its attachment to any of the various indirect heating systems.

I claim as my invention.

1. A device of the class described having a hollow casing connected to a source of water supply, a nozzle projecting from the casing and having an opening extending throughout, a block fastened to the nozzle and provided with an opening communicating with the nozzle opening, a transverse tapering recess, and a very small outlet and a tapering valve plug rotatably fitted in the transverse recess in the block and having a transverse opening which in part is substantially the size of and adapted to register with the enlarged portion of the opening through the block and in part is reduced to substantially the size of and is adapted to register with the very small outlet; the transverse opening through the valve plug tapering to about sixty degrees at the merging point of the reduced opening to obviate back pressure or counter currents, substantially as set forth.

2. A device of the class described having a hollow casing connected to a source of water supply, a nozzle projecting from the casing and having an opening extending throughout, and a block fastened to the nozzle and provided with an opening communicating with the nozzle opening, a transverse recess, and a very small outlet and a valve plug rotatably fitted in the transverse recess in the block; said small outlet being sufficiently short to prevent capillary attraction.

3. The combination with a furnace or the like having an opening in its wall, of a device having connection to a source of water supply under pressure and a nozzle extending through the opening in the wall for introducing water in the form of molecules of vapor into said furnace.

4. A device of the class described having a hollow casing connected to a source of water supply, a nozzle projecting from the casing and having an opening extending throughout, a block fastened to the nozzle and provided with an opening communicating with the nozzle opening and a transverse recess, and a valve plug rotatably fitted in the transverse recess in the block, an extension beneath the block having an opening and a rod supported in said opening and provided at its outer end with a breaking spoon extending in the path of the stream from the outlet.

5. In a device of the class described having a hollow casing connected to a source of water supply, a nozzle projecting from the casing and having an opening extending throughout, a block fastened to the nozzle and provided with an opening communicating with the nozzle opening and a transverse recess, and a valve plug rotatably fitted in the transverse recess in the block, an extension beneath the block having an opening and a rod supported in said opening and provided at its outer end with a breaking spoon extending in the path of the stream from the outlet and a drip cup supported beneath the spoon.

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