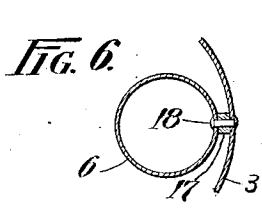
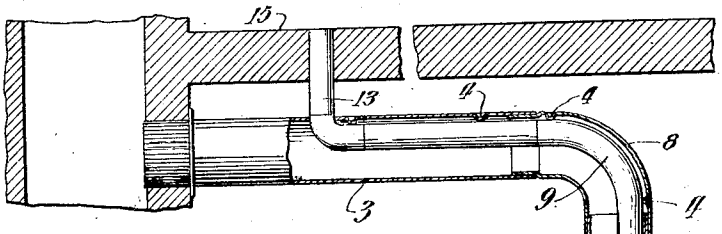
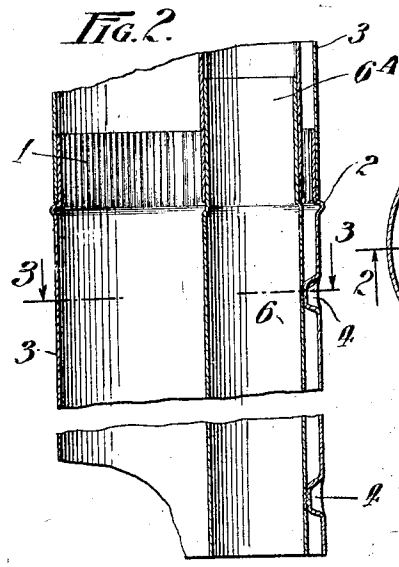
March 24, 1931. R. ELLSDORF 1,797,909

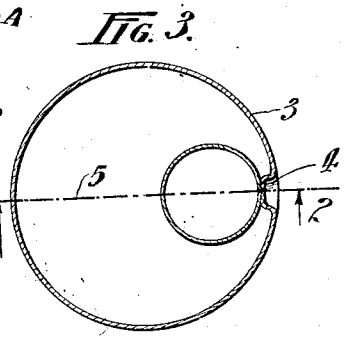
AIR CIRCULATING STOVEPIPE

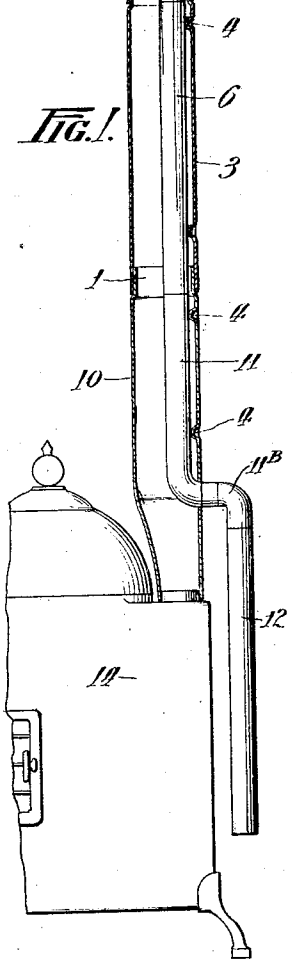
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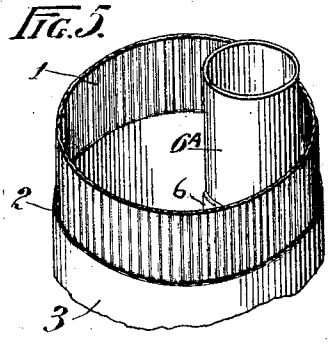


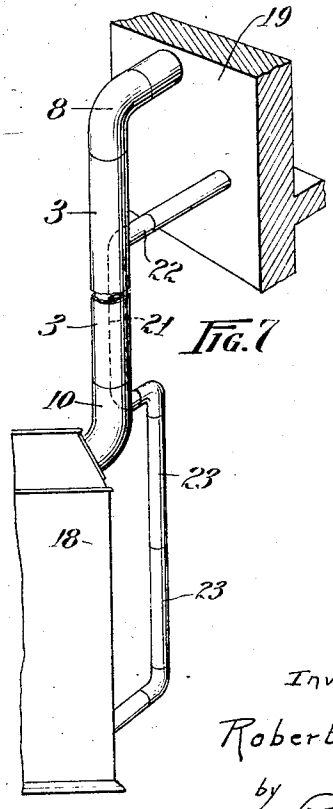


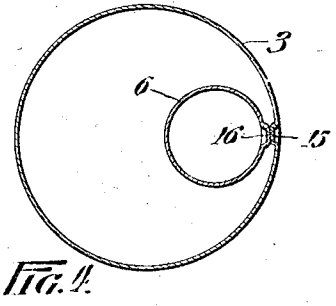












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UNITED STATES PATENT OFFICE

ROBERT ELLSDORF, OF CHICAGO, ILLINOIS

AIR-CIRCULATING STOVEPIPE

Application filed December 30, 1929. Serial No. 417,434.

My invention relates to means for utilizing a part of the heat of the combustion gases which pass up the stove pipe from a stove, and particularly from a coal-burning heater or other stove, by using the heat of the gases within the stove pipe for warming air.

For this purpose, it has heretofore been customary to interpose a drum between the stove and the usual stove pipe, or between two sections of the stove pipe, the drum being constructed so that air can circulate through it. In practice, such drums are usually quite short in proportion to the length of the stove pipe, this being necessary both because of the difficulties in constructing such drums in long lengths and because of the prohibitive costs of drums of considerable length. Consequently, such drums usually receive heat from only a small fraction of the total length of stove pipe between the stove and the chimney, thereby still wasting the greater part of the heat of the combustion gases which pass through the stove pipe.

Furthermore, such air-heating drums are usually both clumsy and unsightly, and do not readily lend themselves to the important purpose of heating air for warming rooms in a story of the house above the one in which the stove is located. So also, such drums cannot readily be constructed so that each drum will include both the usual upright portion of the stove pipe and the horizontal pipe portion which in many cases extends near the ceiling of the room for a much greater length than the upright portion. Unless heat within these horizontal stove pipe stretches is also included, the user attains only a small part of the possible effectiveness which such drums could have even if tall upright drum construction were employed.

It has also heretofore been proposed to employ air pipes extending through stretches of stove pipes, but this has not proven practical because of the difficulties of securing proper joints in both pipes when one is housed by the other, the difficulties of allowing for variations in needed lengths of the two pipes, and the additional difficulty of keeping the two pipes suitably spaced to avoid both rattling and the deposit of soot between them.

My present invention aims to overcome all of the above recited objections in a simple and inexpensive manner, and to provide a combined stove pipe and air pipe which can readily be manufactured in sections arranged so that the needed sections can readily be interposed between a stove and a chimney regardless of the intervening distance or of the number of elbows required in the piping; and which will permit the air pipe to extend for almost the entire length of the stove pipe so as to utilize nearly all of the heat which passes up the chimney from an ordinary stove pipe. Furthermore, my invention aims to provide such sectional twin pipes in a form in which they will be equally suitable in connection with hot air furnaces for prewarming part of the air supplied to the furnaces.

More particularly, my invention aims to provide such a combination stove pipe and air pipe in the form of twin-pipe sections in which each section of the air pipe extends within the corresponding section of the stove pipe and is rigidly secured to the latter so that the air pipe is freely spaced for almost its entire length from the bore of the stove pipe.

So also, my invention aims to provide such combination stove pipe and air pipe sections, which I am hereafter designating as "air-circulating stove pipe sections" as units, designed so that they can readily be telescopically coupled to one another or to the stove and the chimney with the same ease as if they were ordinary stove pipes, and regardless of whether such pipe sections are of straight or elbow formation.

Still further and also more detailed objects will appear from the following specification and from the accompanying drawings, in which

Fig. 1 is a view showing a heating stove connected by the air-circulating stove pipe of my invention to a chimney, with both the stove pipe and the air-pipe portions in central and longitudinal section, and with the air-pipe arranged for supplying warm air to an upper room.

Fig. 2 is a fragmentary and enlarged longitudinal section through an upright portion

of the air-circulating stove pipe, the section being taken along the common diametric plane of both the stove piping and the air-pipe, showing both end portions of one unit section and an attached portion of another unit section of my air-circulating stove pipe.

Fig. 3 is a transverse section taken along the line 3—3 of Fig. 2.

Fig. 4 is a similar section showing a modified form of pipe spacing boss.

Fig. 5 is a perspective view of the upper portion of a unit section of my air-circulating stove pipe.

Fig. 6 is a fragmentary section similar to Fig. 3, but showing the use of a spacer member and a rivet for securing the two pipes of the unit to each other in suitably spaced relation.

Fig. 7 is a fragmentary perspective view showing the use of my air circulating stove piping in connection with a hot air furnace.

In accomplishing the purposes of my invention in connection with a coal stove, I desirably employ as the outer portion of each of my sectional units a stove pipe of standard form and standard length, although this is preferably of a somewhat larger bore than the size generally used with the same stove, so as to allow interior space for the air piping without diminishing the effective cross-sectional area of the stove pipe.

The outer or stove pipe portion of each section extends in generally cylindrical formation from its lower end to within a short distance (as for example two inches) of its upper end and has the portion above this point contracted to an exterior diameter corresponding substantially to the bore of the main portion of the pipe. This is commonly done by forming the short upper pipe end 1 with longitudinal corrugations of relatively small width, and a projecting bead 2 may be formed on the pipe at the juncture of this contracted pipe end with the main stove pipe portion 3.

This main stove pipe portion is provided at a plurality of points spaced longitudinally of the pipe with counterpart indentations or inwardly directed bosses 4, desirably of considerably greater depth radially of the pipe than the thickness of the pipe, these indentations having their axes in a common plane 5 diametric of the said stove pipe portion.

Bearing against the inner ends of the indentations 4 and extending longitudinally of the stove pipe is an air pipe section 6 of considerably smaller diameter than the bore of the stove pipe, this air pipe section having its axis in the said diametric plane 5 and being rigidly secured (as by welding) to each of the indentations.

The air pipe section desirably has its lower end flush with the lower end of the stove pipe portion to which it is secured (as shown in the lower part of Fig. 2), but has its upper end projecting for some distance beyond the upper end of the stove pipe portion, as shown in the upper part of Fig. 2. Moreover, the upper part 6A of the air pipe portion is contracted in diameter, beginning at a level approximately the lower end of the contracted portion 3 of the stove pipe portion, so that the next air pipe portion of the next air circulating twin pipe section can be slid over it for a length corresponding to that of the said contracted stove pipe portion 1 into tight fitting relation to the upper end of the aforesaid air pipe portion.

With each twin-pipe section of my air-circulating stove pipe thus arranged, the air pipe in each section projects beyond the upper end of the stove pipe, as shown in Fig. 5. This makes it easy for the user to couple any two such sections to each other by first slipping the lower end of the air pipe of one section over the projecting end of the air pipe of the second section, then relatively rotating the two sections until their stove pipes are in alinement, and thereafter forcing the two sections toward each other until the end of the stove pipe of one section abuts against the bead 2 on the other section.

By making the contracted upper portion 6A of the air pipe section longer than the upper contracted part 1 of the stove pipe section and making the exterior diameter of the said air pipe portion 6A of such size as to fit the bore of the main portion 6 of the air pipe, I thus secure a tight and rigid interfitting of both pipes in the coupled sections while also facilitating the assembling.

To provide for bends in the piping, I provide correspondingly constructed elbows comprising stove-pipe elbows 8 each having an air-pipe elbow 9 supported in it in the same eccentric relation in which the air pipe is supported in the stove pipe of a straight section or unit of my air-circulating stove pipe.

For attaching to a stove 14, I desirably provide a stove-fitting section 10 within which an air-pipe section 11 is mounted in similar eccentric disposition, this air-pipe section being of an elbow form to present an inlet portion 11B extending through one side of the stove-pipe section 10, so that a depending inlet duct 12 can be supported from the outer end of the inlet portion 11B. If necessary, such stove fitting sections of my air-circulating stove pipe can easily be made by any tinsmith provided with one of my regular straight section units.

For irregular heights or lengths in the piping, the surplus length of any standard section can easily be cut off from the end of the section at which the two pipes are flush with each other. This end is illustrated as the lower end in Fig. 2, but my pipe sections can equally well be used in inverted positions.

Thus arranged, my sectional units permit

an easy, inexpensive and rigid installing of an inner air pipe extending through almost the entire length of a stove pipe and for connecting the outlet 13 of this air pipe to an upper room, as indicated for example in Fig. 1. In practice the air piping is desirably sealed at its exterior to the stove piping (as by a suitable cement) at both the air inlet and the air outlet elbows. With the air pipe freely spaced from the bore of the stove pipe at all points except the fastenings (which can be quite small in total diameters compared with the total length of the piping), I afford a ready circulating of the hot gases all around the air pipe and hence secure the effective use of a large share of the heat of these gases.

However, while I have heretofore described the air pipe in each of my unit sections as welded to indentations in the stove pipe of the same section, I do not wish to be limited to any particular means for spacing the two pipes in each section or for securing them to each other. Nor do I wish to be limited to other details of the construction and arrangement above disclosed, since changes may obviously be made without departing either from the spirit of my invention or from the appended claims.

For example, Fig. 4 shows a transverse section through an air-circulating stove piping also embodying my invention, in which the stove pipe 3 has an inward indentation 15 abutting against and welded to an outwardly directed boss 16 formed on the air pipe 6.

Likewise, Fig. 6 shows a section through another unit, in which the air pipe 6 is spaced from the stove-pipe 3 by a spacer sleeve 17, and in which a rivet 18 extends through the spacer sleeve and the adjacent portions of both pipes to secure the pipes to each in this rigidly spaced relation.

In practice, I preferably dispose the riser sections leading upward from the stove so that the air pipe is nearest to the outward stove-pipe wall, thereby making it easier for any soot in the stove pipe to drop back into the stove; and for the same reason, preferably dispose the air pipe in elbows (like the elbow 8 in Fig. 1.) nearer to the upper than the lower side of the horizontal arm of the elbow. However, I do not wish to be limited in these respects. If the piping needs to be cleaned after a season's use, the sections can readily be pulled apart in the same manner as those of ordinary stove pipe, and by having the two pipes flush with each other at the lower end of each section, I permit the section to be slammed downward against any hard surface to dislodge any accumulated soot and dirt. This flush disposition of the pipes at the lower end of each setcion also permits the dealer to store these sections upright without damaging the projecting air pipe portions.

However, I do not wish to be limited to the above described details of construction and arrangement, since many changes might be made without departing either from the spirit of my invention or from the appended claims.

Nor do I wish to be limited to the use of my air-circulating twin pipe sections in connection with stoves for supplying hot air to rooms other than those in which the stove is disposed. For example, Fig. 7 shows sections of my twin piping employed in connection with one of the hot air pipes leading from a furnace 18 through a wall 19 of an upper room in a hot air heating system. In this case, the inner piping 21 is continued at its upper end by a pipe 22 also leading into the same room, while the lower end of the inner piping is continued by piping 23 leading into the lower portion of the furnace. Thus arranged, the hot air rising in the pipe sections 3 to the room also prewarms air which is drawn downward (by the draft of the furnace) as part of the air supply for the furnace, thereby creating a circulation which continually draws air out of the given room and prewarms it. In view of such other uses for my piping, it is to be understood that I am using the term air circulating twin heater pipe in a broad sense in which it is not limited as to the types of heaters with which it is employed.

I claim as my invention:

1. An air-circulating heater pipe composed of slidably interfitted sections; including main sections each consisting of a length of stove pipe and a length of smaller diametered air pipe rigidly supported within and freely spaced from the stove-pipe, the air-pipe having its axis parallel to but laterally spaced from the axis of the stove pipe; the air pipe projecting at one end beyond the stove pipe and having its other end flush with the corresponding end of the stove pipe.

2. Air-circulating heater piping composed of slidably interfitted sections; including main sections each consisting of a length of stove pipe and a length of air-pipe rigidly supported within the stove-pipe, the air-pipe having its axis parallel to but laterally spaced from the axis of the stove pipe; and also including air pipe elbows connected to opposite ends of the sectional air pipe, each elbow extending laterally through and being exteriorly sealed to the stove piping.

3. A sectional unit for an air-circulating heater pipe composed of consecutively interfitted sections, comprising: an outer pipe having one end thereof formed for telescopically interfitting the opposite end of a counterpart section, an air pipe of smaller diameter than the said outer pipe and disposed within the outer pipe eccentric of the latter and with the axes of both pipes parallel, plural securing means spaced longitudinally of the air pipe for securing the latter to the stove pipe, and

means associated with each of the securing means for spacing the air pipe inwardly from the bore of the stove pipe.

4. A sectional unit for an air-circulating heater pipe composed of consecutively interfitted sections, comprising: an outer pipe having one end thereof formed for telescopically interfitting the opposite end of a counterpart section, an air pipe of smaller diameter than the outer pipe and disposed within the stove pipe eccentric of the latter and with the axes of both pipes parallel; one of the pipes having plural formations spaced longitudinally of that pipe and directed toward the other pipe and engaging the latter pipe for spacing the air-pipe inwardly from the bore of the said outer pipe; the inner pipe having one end thereof flush with the corresponding end of the outer pipe, the other end of the inner pipe projecting beyond the adjacent end of the outer pipe.

Signed at Chicago, Illinois, December 26th, 1929.

ROBERT ELLSDORF.