No. 741,220. PATENTED OCT. 13, 1903.

S. BREDAHL.

STOVE.

APPLICATION FILED APR. 28, 1903.

NO MODEL.

Fig. 1.

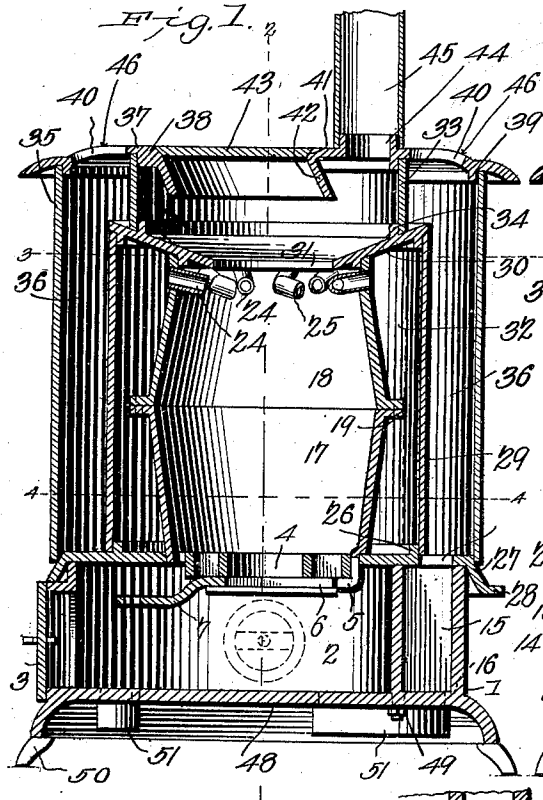


Fig. 2.

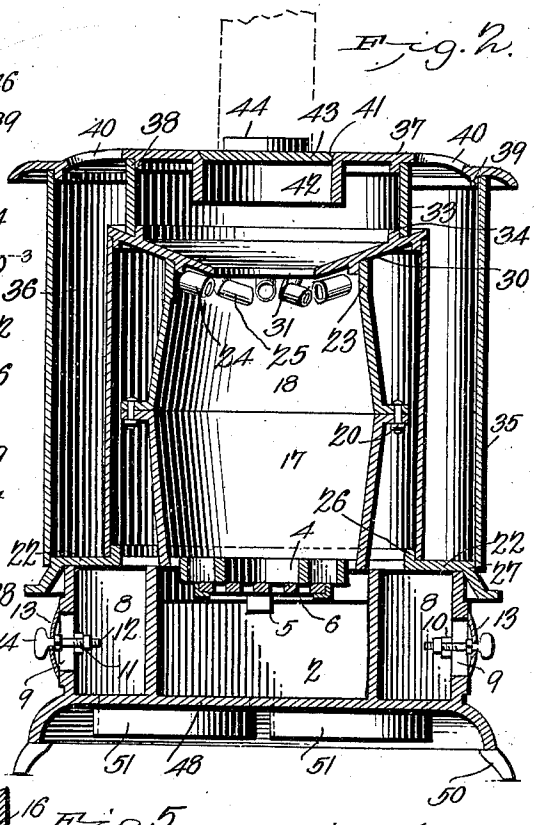


Fig. 5.

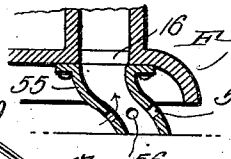


Fig. 3.

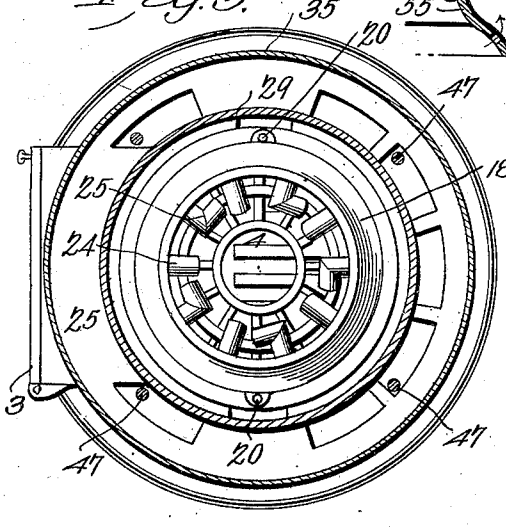
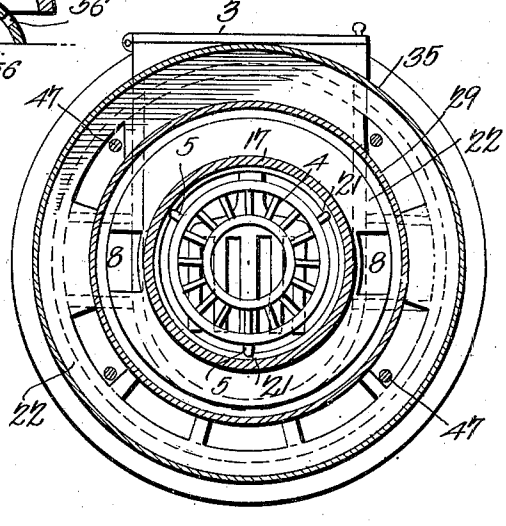


Fig. 4.



Witnesses

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No. 741,220. Patented October 13, 1903.

UNITED STATES PATENT OFFICE.

SAMUEL BREDAHL, OF POWHATTAN, KANSAS, ASSIGNOR OF ONE-FOURTH TO A. D. BATTY, OF POWHATTAN, KANSAS.

STOVE.

SPECIFICATION forming part of Letters Patent No. 741,220, dated October 13, 1903.

Application filed April 28, 1903. Serial No. 154,721. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL BREDAHL, a citizen of the United States, residing at Powhattan, in the county of Brown and State of Kansas, have invented a new and useful Stove, of which the following is a specification.

This invention relates to stoves; and it has for its object to provide a stove for household use which shall be simple in construction and efficient in operation, which shall be economical as regards the consumption of fuel, in which the combustion shall be supported by means of air taken in near the lower end of the stove, permitted to expand in an air-space contiguous to the fire-pot, where the said air is superheated, and finally discharged through peculiarly-arranged pipes into the upper part of the fire-pot, where it is permitted to mingle with the gases of combustion, which expand in a combustion-chamber above the fire-pot, where they will be burned freely with a clear flame and without leaving much of the objectionable residuum usually deposited in the form of soot.

A further object of my invention is to provide, in connection with the features already described, an exterior cylinder for the circulation of air, which is taken in through the bottom of the stove and discharged at the top of the same, thereby quickly and effectively heating the air of the room in which the stove is located.

With these and other objects in view, which will appear as the nature of my invention is better understood, the said invention consists in the construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of a stove constructed in accordance with the principles of my invention. Fig. 2 is a vertical sectional view taken on the line 2 2 in Fig. 1. Fig. 3 is a horizontal sectional view taken on line 3 3, Fig. 1. Fig. 4 is a horizontal sectional view taken on the line 4 4 in Fig. 1. Fig. 5 is a sectional detail view illustrating a modification.

Corresponding parts in the several figures are indicated by similar numerals of reference.

1 designates the base of the stove, which is constructed with the ash-pit 2, provided at its front end with a door 3, through which the contents of the ash-pit may be removed. Above the ash-pit is disposed a grate 4, which is supported upon hooks or lugs 5, depending from the fire-pot in such a manner as to be capable of being oscillated or shaken for the purpose of causing the ashes to drop from the fire-pot into the ash-pit. Said grate is also provided with a slide 6, having a handle 7, whereby it may be shaken and by means of which it may be withdrawn when it shall be desired to dump the contents of the fire-pot.

The base of the stove is provided with air-chambers 8 8, disposed on diametrically opposite sides and provided with inlets or openings 9. Said inlets are spanned by cross-bars 10, having centrally-disposed screw-threaded bearings 11, into which extend screw-threaded stems 12, carrying at their outer ends closures 13, which are adapted to tightly close the inlets 9 and which are swiveled upon said stems, the outer ends of which are provided with handles 14, by means of which they may be manipulated. It will be observed by this construction that by loosening the screw-threaded stems or bolts the covers 13 will be carried in an outward direction from the openings 9, thereby permitting air to enter into the chambers 8. It will also be seen that by this arrangement the admission of air may be very easily and accurately regulated, so that more or less air may be admitted for the purpose of supporting combustion according to the degree of heat which it may be desired to develop. It is obvious that air may also be admitted through the door 3 or through a damper in said door to supply a bottom draft, but the main supply of air for the support of combustion is admitted through the openings 9, and it is obvious that perfect regulation of the fire may thus be established. In addition to the air-chambers 8 the base is provided with air-chambers 15, disposed in front and in rear of the air-chambers 8, from which they are entirely separated. The air-chambers 15 are provided with bottom openings 16 for the ad-

mission of air for circulation, as will be presently understood.

The fire-pot of my improved stove is bulged outwardly about midway between its lower and upper ends, as will be clearly seen in the drawings, and I prefer to construct the said fire-pot of two separate truncated conical castings, the lower one being designated 17 and the upper one 18, said castings being provided at their meeting edges with flanges 19, connected by bolts 20, as shown. The lower casting 17 is provided with the downwardly-extending hooks 5, upon which the grate is supported, and recesses 21 for the accommodation of these hooks are formed in the top plate 22 of the base, so that when the section 17 of the fire-pot is mounted the said hooks engaging the said recesses shall guide it to its proper position and support it securely against displacement. The upper section 18 of the fire pot is preferably provided at its upper edge with a vertically-disposed flange 23, from which a plurality of short pipes 24 and 25 extend inwardly into the fire. The pipes 24 occupy an approximately horizontal position radial to the vertical center or axis of the fire-pot. The pipes 25 are in the form of elbows, the outer parts of which are horizontally and radially disposed, while their inner ends are slanted in a downward direction, all of said elbows being slanted or tilted in the same direction. The hot air, which is admitted through the pipes 24, as will be presently described, will thus be discharged radially toward the axis of the fire-pot, while the air discharged through the elbows 25 will be discharged laterally in a downward direction, so as to set up a spiral current of the gases of combustion rising from the contents of the fire-pot, which spiral current being broken in upon by the radial currents entering through the pipes 23 will effect a more thorough commingling of the gases of combustion and the heated air than could be accomplished by means now ordinarily employed.

The base of the stove is provided with an upwardly-extending flange 26, which is disposed inside of the openings at the upper ends of the air-chambers 15. Outside of the said openings is formed another flange 27, which terminates at its lower edge in a downwardly-extending ornamental flange 28. It will be observed that the openings in the upper sides of the air-chambers 8 are included between the flange 26 and the walls of the fire-pot.

29 designates a cylinder, which may be made either of heavy sheet-iron or cast-iron, said cylinder being fitted to the flange 26, rising from the base. The cylinder 29 extends upwardly above the fire-pot and is provided at its upper edge with a downwardly and inwardly converging flange 30, the central opening of which, 31, is in alinement with the upper end of the fire-pot, said flange being preferably extended inwardly a sufficient distance to cover and protect the pipes 24 and 25. It will be seen that the air which enters through the closures 13 into the chambers 8 will ascend into the air-space 32 between the fire-pot and the cylinder 29. The supply of air being comparatively limited, it will be permitted to expand in the said air-space, where it is likewise intensely heated by direct contact with the entire outer surface of the fire-pot, which latter, as a matter of course, is intensely heated. The air thus heated ascends within the space 32 and is intercepted by the flange 30, whereby a portion of said air is deflected downwardly into the fire-pot, while the remainder of said air is forced to enter through the pipes 24 and 25, whereby, as already described, a spiral current is set up, said current being broken in upon by the air passing through the pipes 24. Such portion of the air as is deflected downwardly by the flange 30 will serve to still further intermix the air with the products of combustion, the final combustion of which takes place in a combustion-chamber formed by an annular ring or casting 33, supported by a vertical flange 34 upon the inclined flange 30 of the cylinder or drum 29. This flange 34 is of less diameter than the cylinder 29, so that the exterior air-space, to be presently described, will be permitted to somewhat expand at its upper end. The downwardly-inclined flange 30 not only operates to intercept and to direct in a downward direction the heated air rising in the space 32, but it also by its peculiar form serves to prevent ashes and the like that may be carried upwardly by the bottom draft from settling permanently upon said flange, and thereby ultimately interfering with the successful operation of the stove.

35 designates the exterior cylinder of the stove, which, like the cylinder 29, may be manufactured of sheet or of cast metal, although the former will probably be preferably employed. The top openings of the air-chambers 15 are included between the cylinders 29 and 35, the space between which, 36, thus forms an air-space for the circulating currents of air which are destined for the heating of the apartment where the stove is located. The stove-top 37 is provided with downwardly-extending flanges 38 and 39, respectively engaging the upper edge of the ring 33, which constitutes the combustion-chamber, and the exterior cylinder 35. Between said flanges the said stove-top is provided with a plurality of openings 40, necessarily alining with the air-space 36 and which serve as exits for the air which is heated during its upward passage through said chamber. The top plate is provided with an opening 41, from which an obliquely-disposed tube 42 extends downwardly and terminates in alinement with the central opening 31 of the inclined flange 30 of the inner cylinder 29. A detachable cover 43 is provided for the opening 41. The top plate 37 is also provided with a suitably-disposed collar 44 for connection with the stove-pipe or exit-flue 45, which leads to the chimney.

The openings 40 in the top plate of the stove

are spaced by cross-pieces 46, some of which are perforated for the reception of stove-rods 47, which extend downwardly through suitable openings in the bottom plate 48 of the base, where they are provided with tightening-nuts 49, by means of which the parts of my improved stove are connected. The base is preferably supported in the usual manner by means of lugs 50, and I desire it to be particularly understood that the openings 16 in the bottoms of the air-chambers 15 may be provided with downwardly-extending flanges 51, which are preferably extended to within a few inches of the floor, thus enabling the air to be taken from what is invariably the coldest part of the room, said air being heated during its upward passage through the space 26 and discharged in a highly-heated state through the openings 40 in the top plate of the stove.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of my invention will be readily understood. The fuel is fed to the fire-pot through the opening 41 and inclined tube or chute 42. The upward draft may be regulated, as described, by means of a door at the front of the ash-pit. As the fire gains headway the air, admitted in any desired quantity through the openings 9 and air-chambers 8, will ascend through the space 29, being there expanded and intensely heated before it is discharged in the manner described into the upper end of the fire-pot, where it is mingled with the ascending gases of combustion, the final combustion taking place in the combustion-chamber formed between the flange 30, the ring 33, and the top plate 37. The latter will obviously be intensely heated and may be satisfactorily utilized for cooking purposes. The air ascending through the openings 16, chambers 15, and air-space 36 will also become highly heated prior to its discharge through the openings 40 in the top plate, but at the same time the air thus ascending will not be so intensely heated as to mar or injure any ornamentation with which it may be desired to provide the outer shell or cylinder of the stove.

I wish it to be understood that I prefer to make my improved stove quite low in proportion to its capacity, the purpose of this being to obviate the necessity of lifting the fuel to any considerable height. Thus I have found in practice that the height of a stove necessary for the heating of an ordinary medium-sized apartment does not need to exceed thirty inches.

By the modification of my invention illustrated in Fig. 5 of the drawings I provide my improved stove with tubular legs, one of which is shown at 55, the upper end of said leg being suitably connected with the base-plate 48 of the stove in alinement with the openings in said base-plate, which are provided for the admission of air into the chambers 15, from whence it passes upwardly to escape in a heated state at the top of the stove. These tubular legs or suports are to be provided at their lower ends with openings 56 for the admission and upward passage of the air, as will be readily understood. It is obvious that the air might be admitted through the side of the base; but by providing the tubular legs or supports herein described I am enabled to take the air from a point very close to the floor of the room where the stove is situated without danger of obstructing the air in the passage.

I have in the foregoing described a simple and preferred construction of my improved heating-stove; but I desire it to be understood that I do not thereby confine myself to the precise structural details shown and described, but reserve the right to any changes, alterations, and modifications which may be resorted to within the scope of my invention and without departing from the spirit or sacrificing the utility of the same.

Having thus described my invention, I claim—

1. In a stove, the combination of a base having an ash-pit, a fire-pot supported by said base and having downwardly-extending hooks alining with recesses in the top plate of the base above the ash-pit, and an oscillatory grate upon said hooks.

2. In a stove, a fire-pot composed of frusto-conical sections flanged and connected at their large meeting ends, the lower section of said fire-pot being provided at its lower end with grate-supporting hooks and the upper section of said fire-pot being provided with inwardly-extending air-inducting pipes.

3. In a stove of the class described, a fire-pot provided near its upper edge with inwardly-extending radial air-inducting pipes, some of said pipes being elbows turned to discharge downwardly and laterally in the same direction to set up within the fire-pot a spiral air-current.

4. In a stove of the class described, a fire-pot provided at its upper edge with air-inducting means for setting up a spiral current within said fire-pot and for breaking in radially upon said spiral current to cause a thorough commingling of the inducted air with the ascending gases of combustion.

5. In a stove of the class described, a fire-pot provided at its upper edge with air-inducting means for setting up a spiral current of air within the fire-pot, and additional inducting means for breaking in radially upon the said spiral current, in combination with an inclosing shell having a downwardly and inwardly deflecting flange, and means for admitting air to the lower end of the space between the fire-pot and the inclosing shell.

6. In a stove of the class described, a fire-pot having a bulging central portion about midway between its lower and upper ends, the upper end of said fire-pot being provided with an approximately vertical flange, in combination with air-induction pipes extending radially through said flange, lateral and

downward extensions at the ends of some of said pipes, an inclosing shell extending above the fire-pot and having a downward and inward deflecting flange extending beyond the discharge ends of the induction-pipes, and means for admitting air to the lower ends of the space between the fire-pot and the inclosing shell.

7. In a stove, the combination of a base, a fire-pot, an inclosing shell having a flange deflecting into the upper end of the fire-pot, a ring supported upon said flange, and a top plate, said ring, flange and top plate combining to form a combustion-chamber above the fire-pot.

8. In a stove, the combination of a base, a fire-pot, an inclosing shell, a downward and inward deflecting flange near the upper end of said shell, radially-disposed air-inducting pipes near the upper edge of the fire-pot, means for admitting air at the lower end of the space between the fire-pot and the inclosing shell, a ring supported upon the deflecting-flange of the inclosing shell, and a top plate coöperating with said ring and flange to form a combustion-chamber above the fire-pot.

9. In a stove, the combination of a base, a fire-pot having radially-disposed air-inducting pipes near its upper end, an inclosing shell provided near its upper edge with a deflecting-flange supported upon the fire-pot and extended beyond the discharge ends of the air-inducting pipes, means for admitting air at the lower ends of the space between the fire-pot and the inclosing shell, a ring supported upon the deflecting-flange, a top plate coöperating with said ring and flange to form a combustion-space above the fire-pot, an obliquely-disposed feed-tube connecting said top plate with the central opening of the deflecting-flange, and a cover for said feed-tube.

10. In a stove, the combination of a base, a fire-pot, an inclosing shell surrounding said fire-pot and having a deflecting-flange near its upper end, an outer shell, a top plate having discharge-openings alining with the upper end of the space between the inner and outer shells, means for admitting air through the bottom plate of the base to chambers in said base, said chambers having openings alining with the lower end of the air-space between the inner and outer shell, means for admitting and gaging the admission of air to the expansion-space between the fire-pot and the inner inclosing shell, means for discharging heated air from said expansion-space into the upper end of the fire-pot, a ring supported upon the deflecting-flange of the inner shell, and a top plate, the latter coöperating with the deflecting-flange and with the ring supported upon the latter to form a combustion-chamber above the fire-pot.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

SAMUEL BREDAHL.

Witnesses:
G. C. RIFE,
FRED E. GRAHAM.