

(No Model.)

2 Sheets—Sheet 1.

J. T. LEE.
REVOLVING GRATE.

No. 549,373.

Patented Nov. 5, 1895.

Fig. 1.

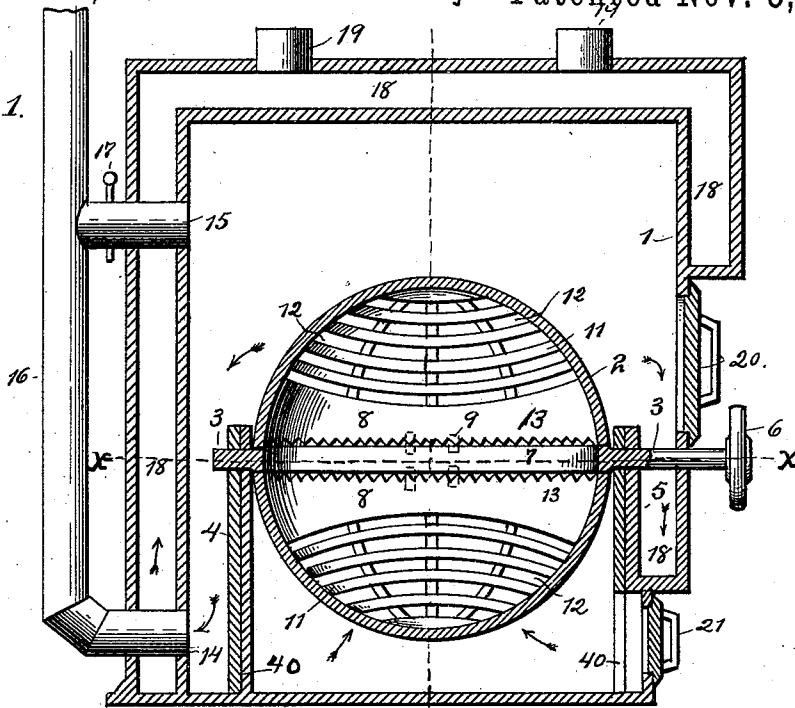
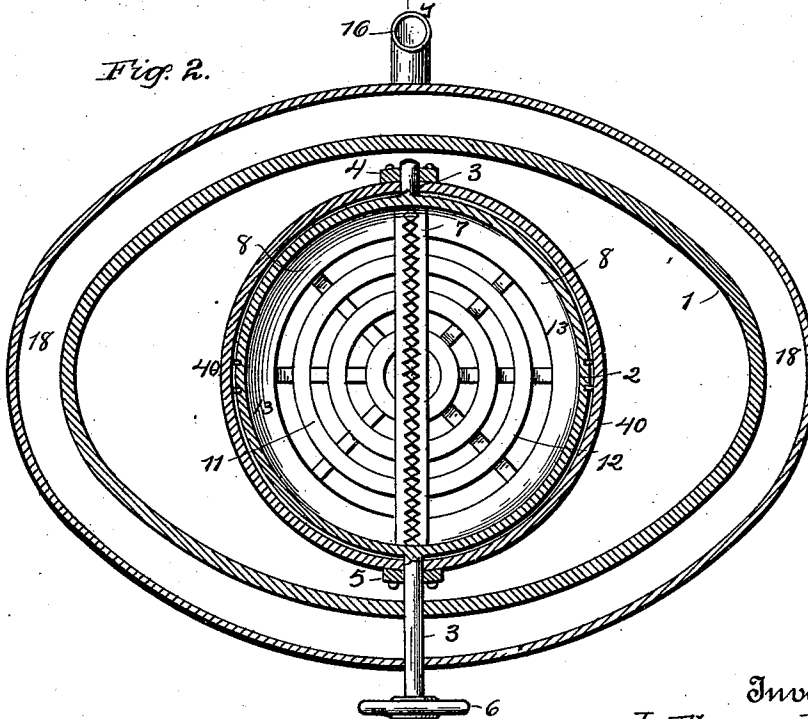


Fig. 2.



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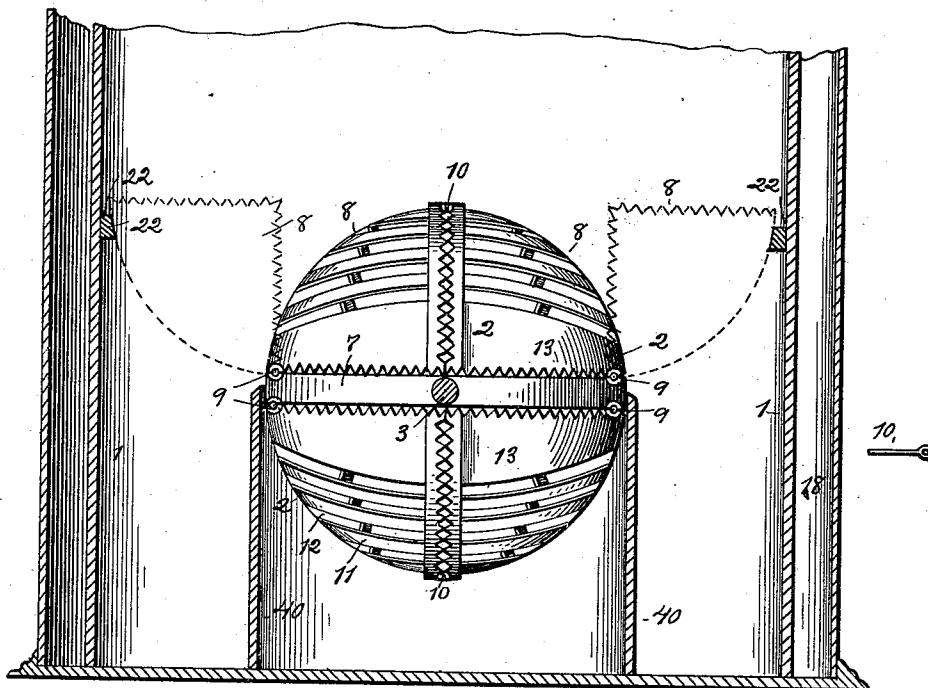
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JULIUS THOMAS LEE, OF BOSTON, MASSACHUSETTS.

REVOLVING GRATE.

SPECIFICATION forming part of Letters Patent No. 549,373, dated November 5, 1895.

Application filed February 1, 1895. Serial No. 536,998. (No model.)

To all whom it may concern:

Be it known that I, JULIUS THOMAS LEE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Revolving Grates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in grates for furnaces, stoves, ranges, and the like; and it consists in an improved revoluble hollow grate, which, while acting as a grate, also acts as a fire-pot, in that it contains the fuel being burned.

The construction and arrangement of the parts of this grate will be hereinafter fully described, and particularly pointed out in the claims.

The object of my invention is to produce a grate which, while cheap in construction and easily operated, will furnish means for keeping the fire constantly clean and will prevent the accumulation of ashes and cinders at the bottom of the fire without waste of fuel in its operation. The prior art furnishes many instances of attempts to construct grates which will completely fulfill the object of the invention stated, and these attempts make use of many kinds and varieties of construction. Sometimes the grate-bars are made separately revoluble, and again the sections of the grate have been so adjusted as to be capable of being moved by themselves, and thus the grate shaken. So far as I am aware, however, no grate has proved entirely satisfactory. The simplicity of construction which the ideal grate should possess has not as yet been obtained in a satisfactorily-operating grate.

I accomplish the above-mentioned object of invention by the use of a revoluble hollow grate, into which the coal or other fuel to be burned is to be placed. The grate thus performs the double office of a grate and a fire-pot. I provide for the free circulation of air through the fire by forming the bottom portion of each half of the grate with a number of draft-flues, but prevent the circulation of air above the surface of the fire, and a con-

sequent deadening of the same, by making the central portion of each half of the grate solid and without apertures. To permit the grate to be supplied with fuel I form the grate of four sections and pivot these parts so that they can be swung outward in pairs, thus not only providing a convenient manner for allowing coal or other fuel to be placed on the grate, but also affording an easy means for dumping the fire. The grate is so mounted as to be easily revolved by a hand-wheel on the outside of the stove.

When the fire-pot has been filled with fuel and has burned a sufficient length of time to cause the accumulation at the bottom of the fire of a quantity of cinders and ashes, I renew or clean the fire by simply turning over the grate. The live or partly-burned coal, being at the top of the fire, will naturally occupy the bottom of the new grate-surface, while the ashes will be sifted out of the grate by the movement stated, and the cinders, being upon the top of the fire, will be completely burned. In this manner I am able to continually renew or clean the fire and obtain a complete combustion of the fuel used without any waste of the same.

My invention is fully represented in the drawings which accompany and form a part of this application, in which the same reference-numerals refer to the same or corresponding parts, and in which—

Figure 1 is a sectional view of a furnace, showing my improved grate in position, and also showing the draft-flues which conduct away the hot air. Fig. 2 is a section of Fig. 1 on the line X X, showing particularly the oval shape of the stove-body used. Fig. 3 is a section of Fig. 1 on the line Y Y, showing the revolving grate in elevation, and in dotted lines two quarters or sections of the grate thrown open for the reception of fuel.

Referring to the drawings, 1 represents the body of the furnace or stove. As shown in Fig. 2, this, in the construction used, is oval or elliptical in shape, for reasons which will be hereinafter stated. 2 represents the spherical grate, which is supported and held in position by short shafts 3, projecting from the surface of the same. These shafts are journaled in the support 4, which extends upward from the bottom of the furnace, and the

bracket 5, which projects outward from one side of the same. One of these shafts extends outside of the furnace-body and is provided with the hand-wheel 6. As the grate 5 is rigidly attached to the shafts, it follows that any movement of the hand-wheel results in a corresponding movement of the grate.

The construction of the grate is most clearly indicated in Fig. 3. As there shown, it consists of a central rim or band of metal 7, from which the shafts 3 project, and of four sections or quadrants 8, each of which is pivoted to the central band, as shown at 9, and is connected with its neighboring quadrant by a removable pin 10, the connection being such as to enable the quadrants to be swung outward. The meeting edges of each quadrant are formed with saw-teeth, so that where the quadrants meet each other or meet the rim or band 7 they present sharp edges adapted to crush the pieces of coal or other fuel in their path, which might otherwise obstruct their normal operation. In order to permit the circulation of air through the fire I form the outer portion of each section with grate-bars 11, between which are air-passages 12. The grate-bars are close enough together to support the fuel, but are sufficiently far apart to permit the air to have free access to the fire. To prevent any air-currents from sweeping across the top of the fire and deadening the same I form the central portion of each quadrant with a strip of imperforate metal 13. This strip is wide enough to keep the air from passing over the top of the fire, and for a definite size of a stove or furnace has a definite size. To further prevent any currents of air from reaching the fire, except through the bottom of the same, I provide a casing 40, which closely surrounds the grate.

Referring now to Fig. 1, in which the direction of air-currents caused by the action of the stove is indicated by arrows, 14 represents the downward draft of the furnace and 15 the upward draft, both of these drafts opening into the chimney 16. A damper 17 is provided for the upward draft 15. 18 represents the hot-air space surrounding the inner shell of the furnace, and 19 are draft-pipes for conducting away such hot air. 20 represents the furnace-door, and 21 the ash-pit.

The operation of my improved stove is as follows: When it is desired to fill the grate with coal or other fuel, the connecting-pin 10 is removed from the side of the grate which is uppermost, being drawn out by a poker or hand bar, and the two quadrants 8 are thrown open and rest against lugs 22, formed on the furnace-body, as shown in Fig. 3. The coal may now be put into the grate, the quadrants meanwhile serving to prevent any of the coal which is being put into the grate from escaping over the sides of the same, forming, as it were, a guideway for the coal. Preferably these quadrants are kept open during the ordinary burning of the fire, as they are

thereby not exposed to the intense heat to which they would be subjected if they were closed. Thus they are not warped or melted by their use. When the fire has burned long enough to cause the accumulation at the bottom of the grate of a sufficient quantity of ashes and cinders to prevent the free passage of air through the fire, I close the grate-quadrants and fasten them together by inserting pin 10. The sharp saw-teeth edges of the quadrants serve to crush any coal which may be in their path and would otherwise prevent their operation. I now turn over the grate by means of the hand-wheel 6. The coal which was on the top of the fire will naturally be at the bottom and on the new grate surface, and being either perfectly fresh coal, or only partially burned coal, is in the most favorable condition for combustion. The ashes sift out of the grate in consequence of the movement of the same. The cinders are upon the top of the fresh fire, where they can best be burned, so that their combustion is not lost, as is the case in the present constructions. This reversal of grate-surface may be made to take place as frequently as desired, and the fire can thus be kept perfectly fresh and bright. When it is desired to dump the fire, this can be accomplished by taking out the connecting-pin 10 at the lower side of the grate and moving apart the quadrants. The fuel will then fall into the ash-pit.

In order to permit the quadrants to be freely opened in the manner shown in Fig. 2, it will be seen that it is necessary that the furnace-body have a greater diameter in one direction than in the other, and for this reason the oval shape shown in Fig. 2 has been chosen.

While I have illustrated my grate as being spherical, and have illustrated the casing therefor as an oval casing, I do not wish to be restricted to these specific forms, nor to the unessential details of construction shown; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a furnace body, of a revoluble hollow grate journaled therein, said grate being composed of a central ring or band extending on either side of its center sufficiently far to prevent air currents from sweeping over the top of the fire, and a series of sections pivoted to said ring, and adapted to open and swing outward, the said sections being locked together so as to form two groups, each of which constitutes one-half of the grate, and can be separately unlocked and thrown open, substantially as described.

2. The combination with a furnace body, of a revolubly hollow grate journaled therein, the said grate being composed of a central ring or band extending on either side of its center sufficiently far to prevent air currents from sweeping over the top of the fire, four sections or quadrants pivoted to said ring, and adapted to open and swing outward, the said sections being locked together so as to form two groups, each of which constitute

one-half of the grate, and can be separately unlocked and thrown open, substantially as described.

3. The combination with a suitably formed
5 furnace body, of a revoluble hollow grate journaled therein, the said grate being composed of a series of sections pivoted together and adapted to open and swing outward, the meeting edges of said sections being toothed,
10 substantially as described.

4. The combination with a suitably formed
furnace body, of a revoluble hollow grate journaled therein, the said grate being composed of a series of sections pivoted together
15 and adapted to open and swing outward, each of said sections being formed with a solid portion toward the center of the grate, and a

grated portion toward the ends of the grate, substantially as described.

5. The combination with a suitably formed 20
furnace body, of a revoluble hollow grate journaled therein, means for revolving the same, and the upright circular casing 40, surrounding said grate, and preventing air currents from reaching any portion of the fire 25
except the bottom of the same, substantially as described.

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

J. THOMAS LEE.

Witnesses:

KITTIE V. STANFORD,
EUGENE H. MOORE.