Aug. 4, 1925. 1,548,292

U. WEDGE

FURNACE

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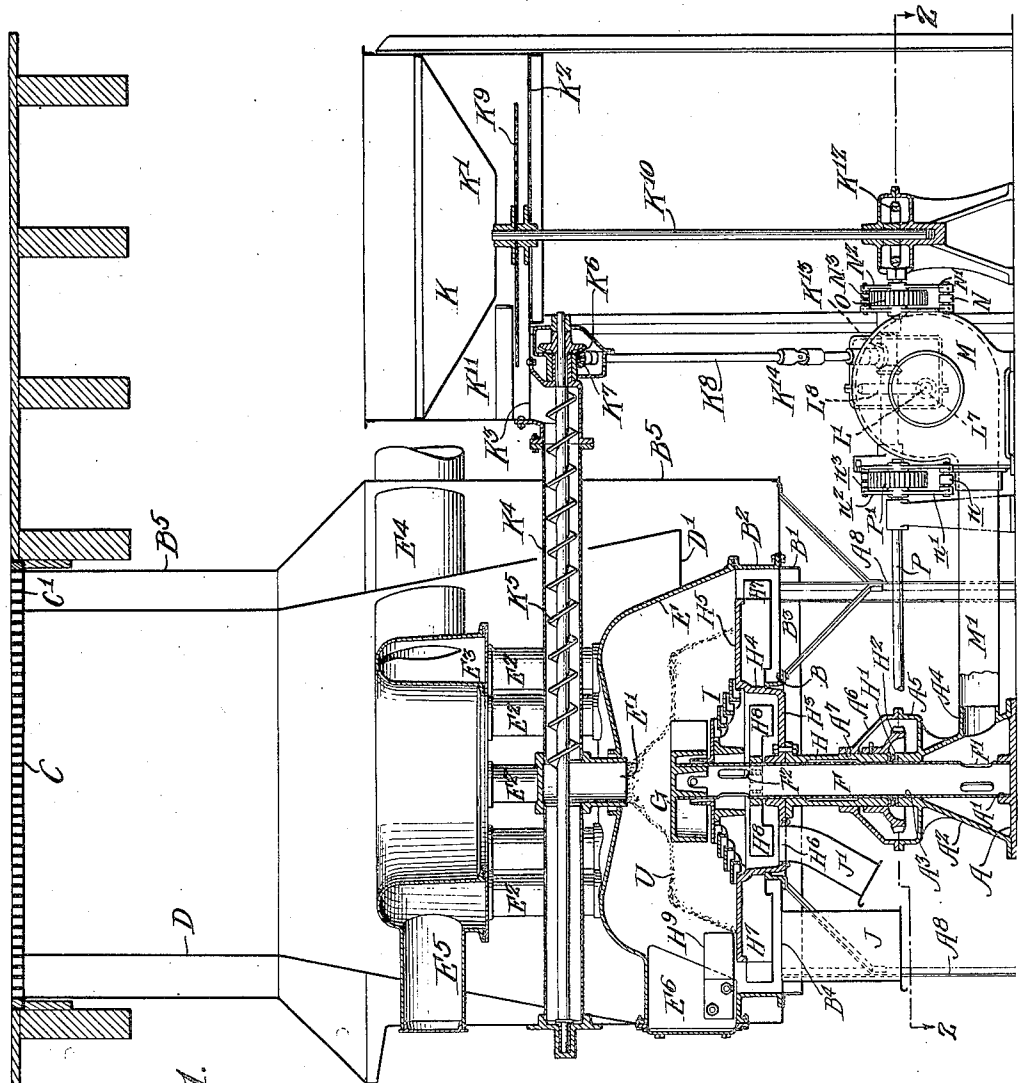


Fig. 1.

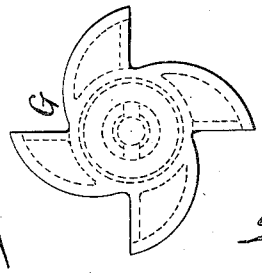


Fig. 4.

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Fig.2.

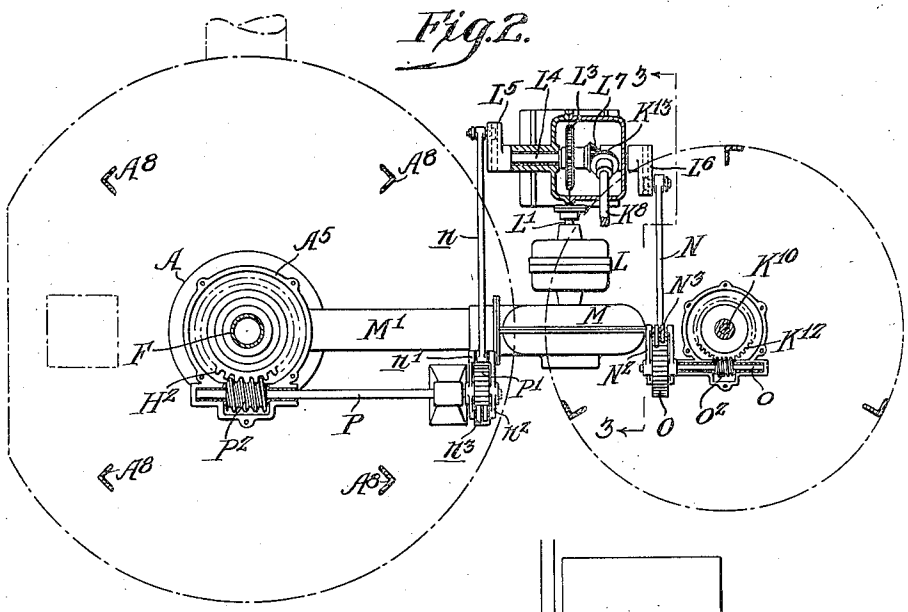


Fig.3.

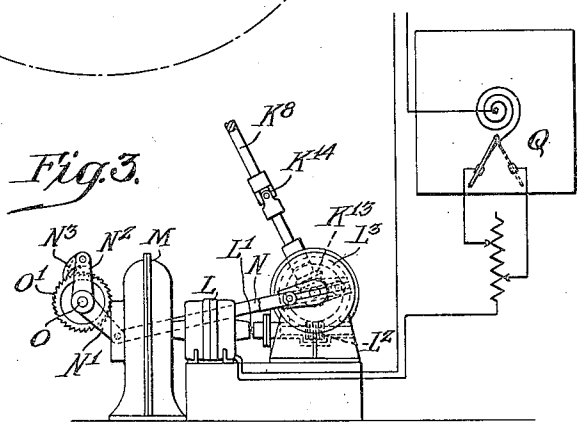
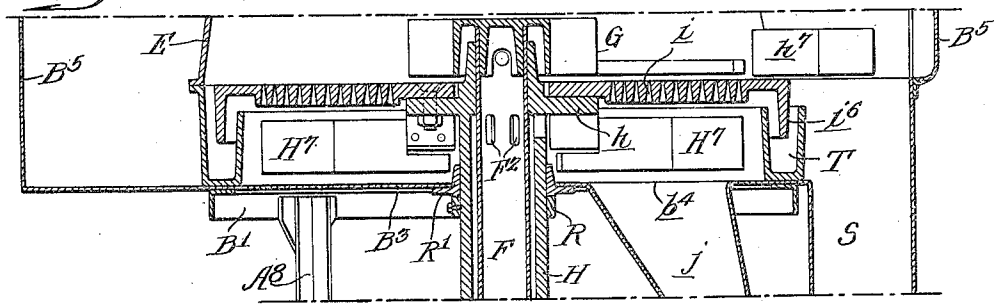


Fig.5.



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Patented Aug. 4, 1925. 1,548,292

UNITED STATES PATENT OFFICE.

UTLEY WEDGE, OF ARDMORE, PENNSYLVANIA.

FURNACE.

Application filed August 18, 1922. Serial No. 582,735.

To all whom it may concern:

Be it known that I, UTLEY WEDGE, a citizen of the United States of America, and resident of Ardmore, in the county of Montgomery, State of Pennsylvania, have invented a certain new and useful Improvement in Furnaces, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to furnaces and while in many respects adapted for general furnace construction, it is especially designed for application to domestic furnaces for heating houses. The object of my invention is to provide a furnace which will burn fuel with great efficiency and economy and is especially adapted for economical use with a great variety of fuels.

The nature of my improvements will be best understood as described in connection with the drawings in which they are illustated and in which

Figure 1 is a sectional elevation of the furnace and fuel feeding mechanism shown in connection with mechanism for feeding the coal, rotating the gate, and forcing air into the furnace.

Figure 2 is a plan view on the line 2—2 of Fig. 1.

Figure 3 an elevation at right angles to the view shown in Fig. 1, showing a portion of the actuating mechanism.

Figure 4 is a plan view of the fuel distributor used in connection with and in a sense forming a part of the grate, and

Figure 5 is a sectional elevation showing a modification of the grate and of the ash hoppers.

A is a base plate having a central annular rim A′. Supported on the plate A is the casing A^2 having, as shown, a bearing surface A^3 and an opening A^4 for the entrance of air. The upper part of this casing, indicated at A^5, in connection with the movable part indicated at A^6, forms an enclosing casing for the gear mechanism to be described, the bearing, indicated at A^7, and the rotatable sleeve H. A^8 A^8 are angle iron columns supporting at their tops the angle iron ring indicated at B′ and through brackets, as shown, the ring indicated at B. B^3 is the bottom plate of the furnace supported on the rings B and B′. B^2 is an annular ring forming the bottom of the furnace chamber and supporting the casing E which forms the top of the furnace chamber and is provided with a centrally located opening indicated at E′ for the delivery of fuel. E^2 E^2 etc. are flues leading from the top of the furnace, the annular flue or drum E^3 from which leads the smoke pipe indicated at E^4 and an inspection conduit indicated at E^5. E^6 indicates an opening leading into the furnace by which access can be had to the internal mechanism. F is a vertical pipe stepped in the annular rim and having openings in its bottom indicated at F′ for the entrance of air and openings at its top indicated at F^2 through which the air escapes into the bottom of the furnace. G is a portion of the grate acting as a fuel distributor and is secured to the top of the pipe F. H is a sleeve surrounding the pipe F and supported, as shown, on ball bearings indicated at H′. To this sleeve is attached the gear wheel H^2 by means of which, and mechanism to be described, it is rotated. To the top of the sleeve H is secured the annular plate indicated at H^3, H^4, H^5, on which is supported the rotatable grate indicated at I. In the portion H^3 of the annular plate before mentioned is formed the opening H^6 to which is connected an ash receptacle indicated at J′ and in the bottom plate B^3 is formed the opening B^4 to which is connected the ash receptacle indicated at J. H^7 H^7 indicate ash sweepers secured to the plate H^3, H^4, H^5, as shown, and moving with said plate. At H^8 H^8 are ash sweepers secured to the pipe F and in the organization shown remain stationary. K is a fuel hopper having an open bottom K′ and set in a cylindrical casing having a flat bottom K^2 at one side of which is formed an opening K^3 opening into a conveyor tube K^4 in which is located a conveyor screw K^5 by which the fuel is moved to the opening E′. K^6 is a gear wheel secured to the shaft of the conveyor K^5 and engaged by a gear K^7 on the shaft K^8 which, as shown, is provided with a universal joint K^{14} and a gear wheel K^{13} at its bottom. K^9 is a rotating disc located beneath the hopper bottom above the flat plate K^2 and rotated by means of a shaft K^{10} having a gear wheel K^{12} secured to its bottom, as shown in Figs. 1 and 2. K^{11} is a sweeper extending over the edge of the rotating disc K^9 so as to sweep the fuel from the edge of this plate into the opening K^3.

L is an electric motor actuating the shaft L′, one end of which actuates the fan indicated at M, on the other end of which is secured the worm L^2 engaged with the worm wheel L^3, secured to the shaft L^4, on the ends of which shaft are secured the slotted crank arms indicated at L^5, L^6. The crank arm L^6 actuates the connecting rod N which is connected to the arm N′ of a lever N′ N^2 pivoted on the shaft O and acting through pawls N^3 and a ratchet wheel O′ on the shaft O which shaft, through a worm indicated at O^2, engages the worm wheel K^{12} and actuates the shaft K^{10}. The crank arm L^5 actuates the connecting rod *n* which, through the lever *n′* and n^2 and the pawl n^3 actuates the ratchet wheel P′ and the shaft P; said shaft, through a worm P^2, engaging the worm wheel H^2 which is attached to the sleeve H and by means of which the grate I is rotated.

At Q, Fig. 3, I have indicated a thermostat by means of which the speed of the motor L can be regulated and through the motor the speed of the different operative parts are controlled.

In the modification illustrated in Fig. 5, the flat outer grate indicated *i* is secured to the top of the sleeve H, being attached to the flange *h*, as shown. To this flange are also attached the scrapers H^7 which move over the bottom plate B^3 in which is formed the usual opening b^4 leading into the ash receptacle *j*. The circular grate is formed with a downwardly extending flange indicated at i^6 which is shown extended to the annular gutter indicated at T. h^7 indicates a scraper secured in fixed position and operating to sweep ash from the outer edge of the grate into the ash receptacle indicated at S.

In operation the hopper K is filled with fuel which, of course, rests upon the rotating disc or table K^9; the motor being in operation the disc K^9 is rotated by a series of intermittent movements imparted by the ratchet movement described. The worm feed K^5 is rotated by the described mechanism and an intermittent rotative movement given to the shaft P and through it and the described gearing, to the sleeve H and the annular plate H^3 H^4 H^5 and to the grate portion supported on this plate. At the same time the fan is actuated, driving air through the conduit M′ into the casing A^2 and through the vertical pipe F into the space beneath the grate. The fuel fed to the furnace chamber falls through the opening E′ on to the top of the fuel distributor G and on to the top of the grate portion I, and, as the grate revolves, the fuel is pushed out by the distributor which, as shown and above described is stationary, although of course it operates in the same way as though the distributor rotated and the outer grate stood still. The air blast finds its way through the grate and the products of combustion pass off through the vertical drums E^2, the angular drum E^3 and the smoke pipe E^4; such ash as falls through the grate I falls upon the rotating portion H^3 of the plate H^3 H^4 H^5 and the stationary sweepers H^8 sweep it into the opening H^6 and into the ash receptacle J′; such ash as approaches the outer rim of H^5 is swept off the plate and into the opening B^4 by the sweeper H^9 and is caught in the receptacle J.

Obviously the rate at which fuel is fed to the furnace, the amount of air supplied and the speed of rotation of the grate should vary with the amount of heat required and this is readily provided for by the provision of a thermostat, as indicated in Fig. 3, to control the speed of the motor.

In the modification shown in Fig. 5, a flat grate is used and stationary hoppers are provided for the ash which passes through the grate and the ash which is swept off from the top of the grate. In other respects the operation of the modified device is practically the same as that already described.

While in my claims I refer to the two positions of my grate as being one stationary and the other relatively movable, it will be obvious that both may move so long as there is such relative difference in their rotative movement as to result in the central element acting to push the fuel outward over the outer element. That is to say, my claims are intended to cover all equivalents.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a furnace for burning solid carbonaceous fuel in a shallow shifting layer moving radially outward over the grate, a relatively rotating perforated grate in combination with a relatively stationary fuel pusher of relatively small diameter centrally located above and close to the grate surface and characterized by having obliquely set pusher arms angled with reference to the rotating grate surface to push the fuel lying between them on the grate surface outward onto the outer portion of the grate and centrally located means for feeding fresh fuel over the fuel pusher and between its pusher arms.

2. In a furnace for burning solid carbonaceous fuel in a shallow shifting layer moving radially outward over the grate, a rotating perforated grate in combination with a stationary fuel pusher of relatively small diameter centrally located above and close to the grate surface and characterized by having obliquely set pusher arms angled with reference to the rotating grate surface to push the fuel lying between them on the grate surface outward onto the outer portion of the grate and centrally located means

for feeding fresh fuel over the fuel pusher and between its pusher arms.

3. In a furnace for burning solid carbonaceous fuel in a shallow shifting layer moving radially outward over the grate, a rotating perforated grate in combination with a stationary fuel pusher of relatively small diameter centrally located above and close to the grate surface and characterized by having obliquely set pusher arms angled with reference to the rotating grate surface to push the fuel lying between them on the grate surface outward onto the outer portion of the grate, centrally located means for feeding fresh fuel over the fuel pusher and between its pusher arms, an ash receptacle below and at one side of the grate and a sweeper operating on the edge of the rotating grate to sweep ash into the receptacle.

4. In a furnace for burning solid fuel the combination with a furnace chamber of a grate for supporting the fuel made up of a stationary cam shaped central portion and a rotatable perforated outer portion, said cam shaped central portion being so formed as to progressively push the fuel outward onto and over the perforated outer portion, a conveyor for feeding fuel to the centre of the grate, a fuel hopper having a rotating disc located below its bottom opening, a scraper arranged to sweep fuel from said disc into the conveyor, an air conduit opening below the grate and power means for rotating the disc and grate.

UTLEY WEDGE.