Nov. 17, 1931. J. KLOPFENSTEIN 1,832,223

SAWDUST BURNER

Filed Aug. 6, 1929

FIG. 2

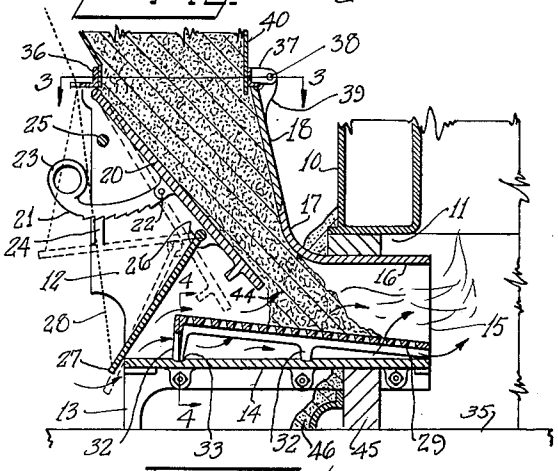


FIG. 1.

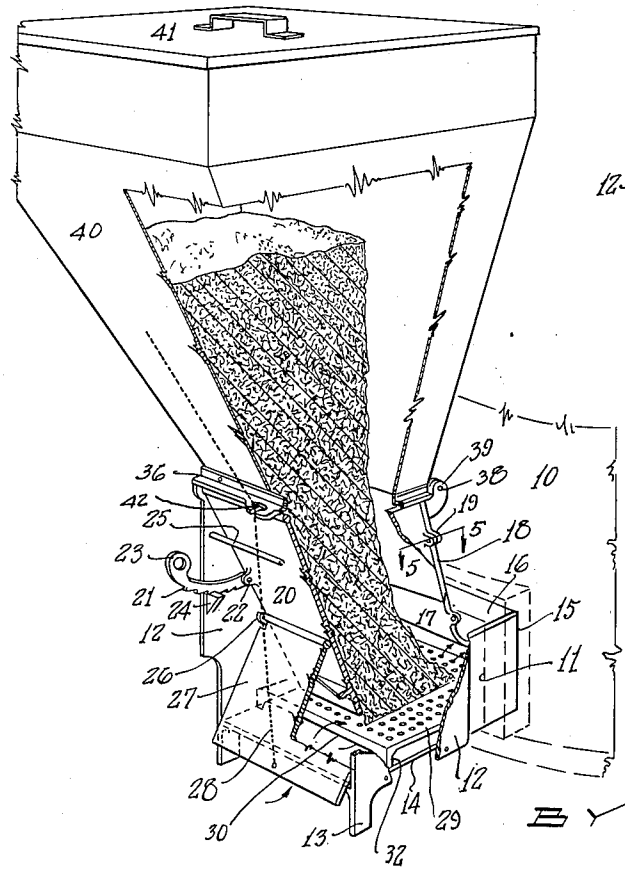


FIG. 3

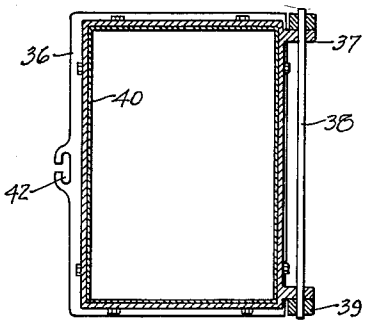


FIG. 5

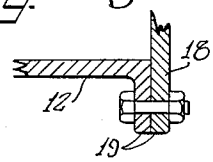


FIG. 4

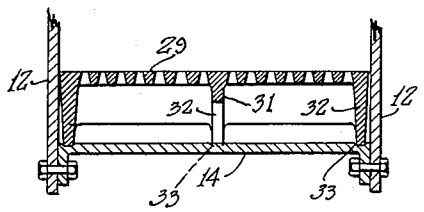
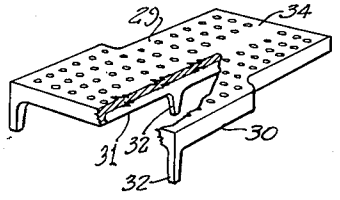


FIG. 6



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Patented Nov. 17, 1931 1,832,223

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SAWDUST BURNER

Application filed August 6, 1929. Serial No. 383,815.

The main object of this invention is to provide a special form of burner for sawdust and hogged fuel which may readily be attached to any ordinary furnace without making any special alterations other than removing the grates.

The second object is to provide a sawdust burner which will completely overcome the principal objection regarding such devices now in use, namely that of backfiring.

The third object is to so construct the burner as to simplify same as much as possible, both as far as construction and operation are concerned.

The fourth object is to so construct the burner that it will be protected against self-destruction by cooling currents of air which are constantly carrying off the heat from the parts in direct contact with the fire.

The fifth object is to provide a sawdust burner having a fixed grate setting which need not be altered for any kind of fuel employed.

The sixth object is to so construct the draft regulating apparatus that fresh air is admitted simultaneously to the under side of the grates and to the top side of the grates through the descending fuel.

The seventh object is to so construct the burner as to make same easily adjustable as to the amount of fuel passing through same and also extremely easy to clean without the necessity of emptying or removing the fuel magazine.

These, and other objects, will become more apparent from the specification following as illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of the burner with portions broken away in section to disclose the interior.

Figure 2 is a longitudinal vertical section through the burner.

Figure 3 is a horizontal section taken along the line 3—3 in Figure 2.

Figure 4 is a section taken along the line 4—4 in Figure 2.

Figure 5 is a section taken along the line 5—5 in Figure 1.

Figure 6 is a perspective view of the grate with a portion broken away.

Similar numbers of reference refer to similar parts throughout the several views.

Referring in detail to the drawings, there is shown a front 10 of a furnace including the ash door opening 11 into which this device is inserted.

Referring directly to the burner it will be seen to consist of a pair of side frames 12 each of which has a leg 13 at the outer end thereof. Between the frames 12 is bolted a floor plate 14. The end 15 projects into the furnace and is covered by a top plate 16 whose outer end 17 curves upwardly and matches with the back plate 18 which extends to the top of the frames 12, to which it is secured by means of bolts through the lugs 19.

Between the outermost upper portions of the frames 12 is hinged a fuel regulating plate 20 whose position is controlled by a serrated arm 21, one end of which is hinged to the plate 20 by means of the pin 22, and the other end of which is provided with a handle 23 by means of which the plate 20 may be swung to the desired position and latched on the projecting lug 24 which is formed on one of the side frames 12. A tie bolt 25 unites the frames 12 at their outer edge.

At the outer and under side of the plate 20 are formed the hook rings 26 into which is hinged the damper plate 27 whose outer edge is attached to a chain 28 which may be operated from the floor above.

The side frames 12 do not lie in straight planes but are slightly offset for the purpose of making the ends 15 somewhat closer together and providing more great area at the outermost portion of the grate.

The grate itself consists of a perforated plate 29 having downturned edges 30 and a stiffening rib 31 as well as legs 32 at the rearward end thereof and under the rib 31. The feet of the legs 32 rest in depressions 33 in the floor plate 14 when the grate 29 is in the correct position. The grate 29 is somewhat narrower at its end 34 to conform to the space between the side frames 12. It will be noted that the grate 29 is almost horizontal and

that it is separated from the floor 35 of the furnace room.

On top of the frames 12 is mounted a rectangular hopper base 36 provided with a pair of backwardly turned ears 37 through which passes a rod 38 which is supported by the lugs 39 on the back plate 18. The remainder of the base 36 rests squarely upon the upper edge of the side frames 12 and the upper portion of the fuel regulating plate 20. A sheet metal hopper 40 is riveted to the base 36 and is preferably provided with a cover 41. On the base 36 is formed a partially enclosed slot 42 in which lies the chain 28, the purpose of which is to permit the upper portion of the chain to lead off in any lateral direction without exerting a side pull on the draft regulating damper 27.

To install these burners it is only necessary to remove the ash door and grates and insert the outlet of the burner into the ash door opening as far as possible and then to close up the remaining space by means of fire bricks 45 and fire clay 46.

The operation of the burner is as follows: Fuel 43, such as sawdust or hogged fuel consisting of ground up wood, is placed in the hopper 40 but is prevented from falling upon the surface of the grate 29 by pushing the fuel regulating plate 20 to a closed position. The plate 27 is then lifted out of the way and a fire is started on the grate 29. As the fire gets under way the plate 20 is gradually lowered to the position shown in full lines in Figure 2, allowing the fuel to descend upon the burning kindling. As the heat is generated the surrounding metal parts become warm and assist in the generation of gas and the pre-heating of the air as it enters the combustion zone.

The draft regulating plate 27 it now lowered to check the flow of air to the burning fuel and this can be controlled to a nicety by the distance separating the plate 27 from the outermost end of the floor plate 14. For example, the plate 27 can be raised to the position shown in dotted lines in Figure 2 giving a wide open draft. As the fuel burns, more descends from the hopper 40 and it will be observed that there is a free discharge of air along the entire bottom of the grate 29, and also against the screen 44 of fuel descending from the edge of the plate 20, which is naturally at a red heat during operation.

During the process of combustion small particles of burning fuel fall downwardly through the perforations in the plate 29 and the floor plate 14 in the form of sparks which, by the time they reach the interior of the furnace are completely consumed, eliminating thereby any undue accumulation of ashes or the formation of clinkers which is usually objectionable in similar devices.

While the combustion produced by this burner is usually complete, which is of course highly desirable, from a safety standpoint the construction of the burner so as to eliminate any trapped gases which may subsequently be fired, is of great importance.

While the hopper has been mounted on the burner and held in place by means of the ears 37 and the lugs 39 through which passes the rod 38, it must be understood that this is in no sense a hinge since the back of the hopper lies close to the front of the furnace and it would be impossible to swing the hopper if it were desired to do so, but this action is entirely unnecessary. If it is desired to clean out the burner it is only necessary to push the fuel regulating plate 20 to a closed position, which will prevent the flow of fuel from the hopper 40 rendering it unnecessary to empty the hopper for the purpose of cleaning out the grate, as the grate which I employ is extremely light and can be lifted out for cleansing purposes without any special effort.

I am aware that numerous forms of sawdust burners have been constructed in the past; it is therefore not my intention to cover such devices broadly, but I do intend to cover all such forms and modifications thereof as fall fairly within the appended claims.

I claim:

1. A sawdust burner consisting of a fire box, a stationary perforated grate covering the bottom of said fire box, a fuel magazine mounted over said grate, a fuel regulating plate for controlling the flow of fuel from said magazine to said grate, and a draft control plate hinged to said fuel regulating plate having its lower end extending beyond the outermost lower edge of said fire box.

2. A sawdust burner consisting of a pair of spaced side frames, a floor plate mounted between said side frames, a cover over one end of said side frames extending upwardly to form a back plate for the burner, a fuel regulating plate between said side frames forming the front side of the burner, a perforated stationary grate mounted on said floor plate under said fuel regulating plate, and a draft plate adapted to control the flow of air between the under side of said fuel regulating plate and the top side of said floor plate.

3. A sawdust burner having a pair of fixed side frames, a hinged front adapted to control the supply of fuel thereto, and a damper hinged to said front for controlling the flow of air to said fuel.

4. In a sawdust burner the combination of a pair of side frames, a spacing floor across the lower portion thereof, an elevated perforated grate mounted on said floor under which and over which air can pass into the combustion zone, a fuel regulating plate between said side frames hinged at the upper portion thereof, means for adjusting the position of said fuel regulating plate, a damper plate removably hinged to said fuel regu-

lating plate having its lower end adapted to rest against the outermost portion of the floor member, and means for adjusting the position of said damper with relation to said floor member.

5. In a sawdust burner the combination of a grate with a magazine for supplying fuel to said grate, said magazine having one swinging side constituting a fuel regulating plate at the outlet end of said magazine, a floor under said grate, and a damper plate hinged to the swinging end of said fuel regulating plate and normally resting against the end of said floor when cutting off the flow of air to the grates.

6. A sawdust burner having in combination a pair of side frames, a floor between said side frames, a movable front mounted between said side frames comprising a fuel regulating plate hinged between the upper ends of said frames, a damper plate hinged to the swinging end of said fuel regulating plate between the lower end of said fuel regulating plate and said floor, and a grate resting upon said floor over which and under which the flow of air is regulated by said damper plate.

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