No. 752,389. PATENTED FEB. 16, 1904.

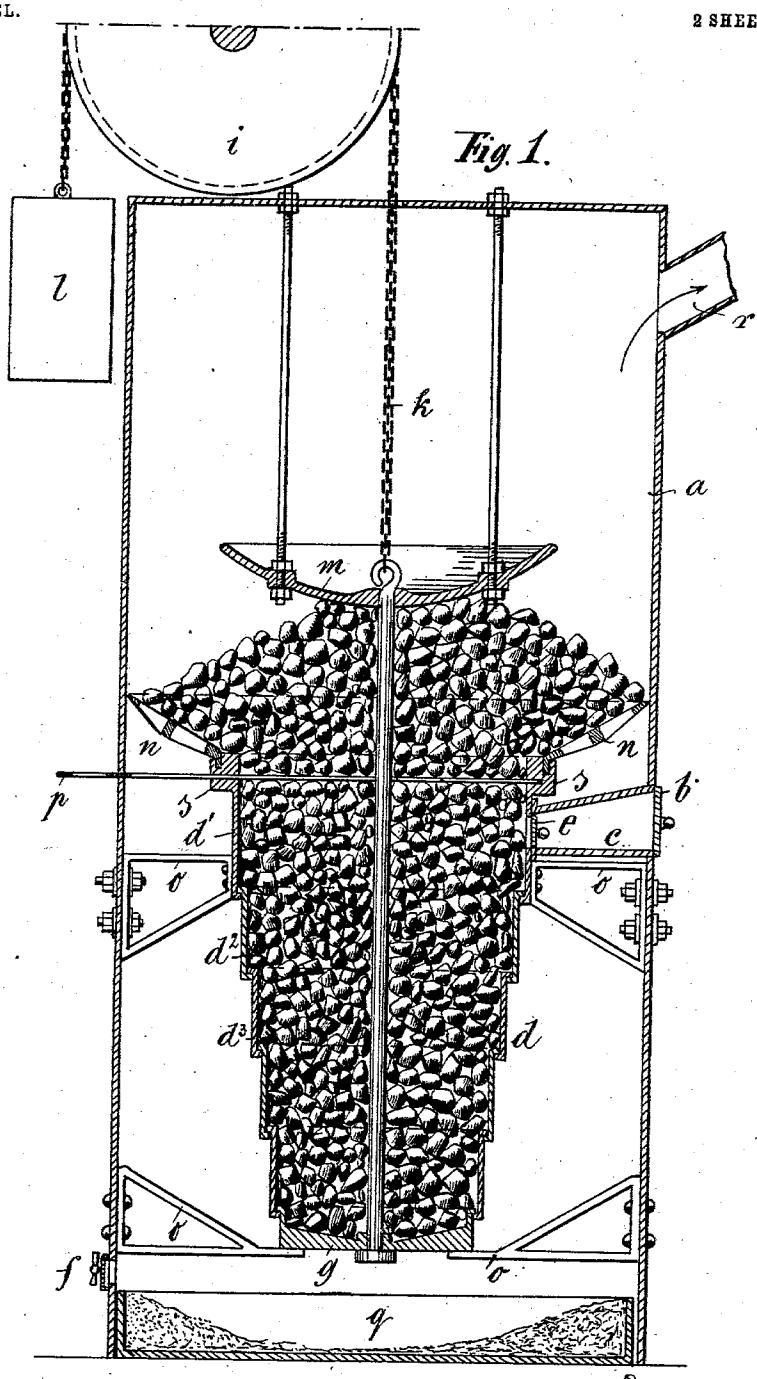
E. ENGELS.

SYSTEM OF FEEDING SLOW BURNING STOVES.

APPLICATION FILED APR. 16, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



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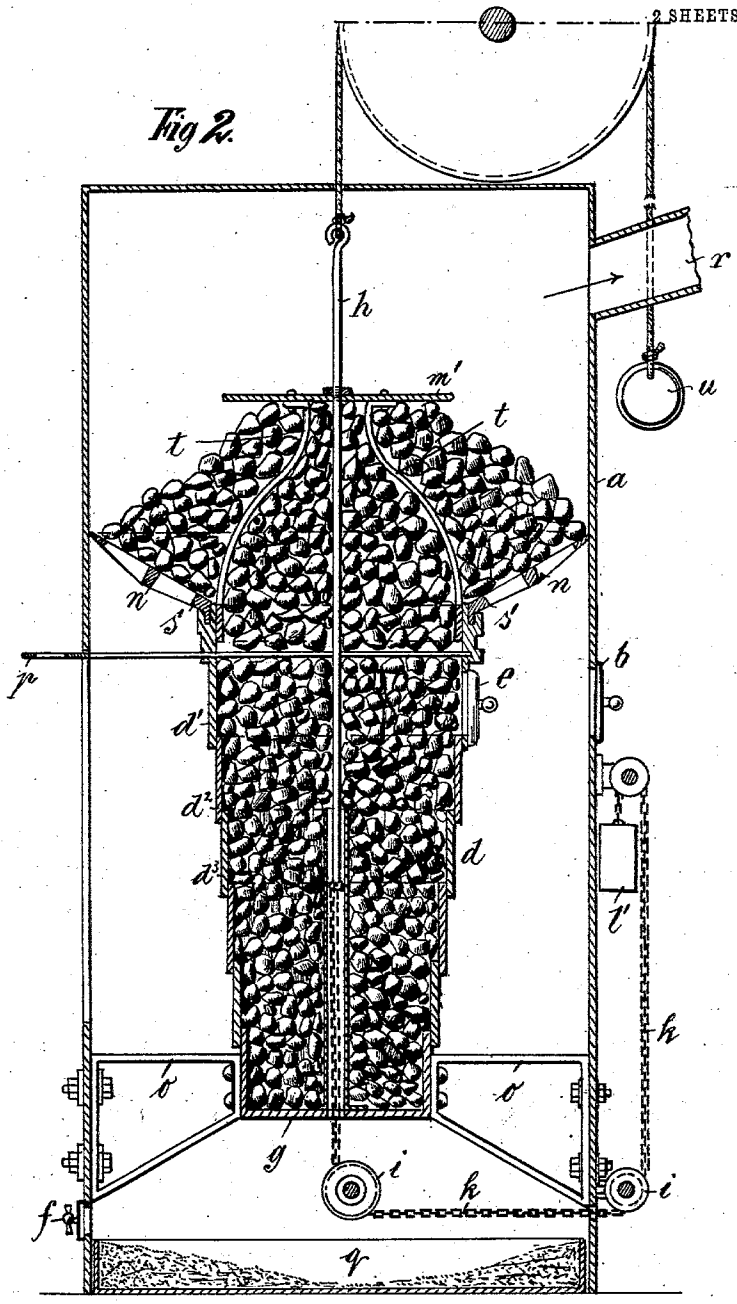
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SYSTEM OF FEEDING SLOW BURNING STOVES.

APPLICATION FILED APR. 16, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig 2.



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No. 752,389. Patented February 16, 1904.

UNITED STATES PATENT OFFICE.

EWALD ENGELS, OF DUSSELDORF, GERMANY.

SYSTEM OF FEEDING SLOW-BURNING STOVES.

SPECIFICATION forming part of Letters Patent No. 752,389, dated February 16, 1904.

Application filed April 16, 1903. Serial No. 152,927. (No model.)

To all whom it may concern:

Be it known that I, EWALD ENGELS, doctor of philosophy, a subject of the Emperor of Germany, residing at 72 Parkstrasse, Dusseldorf, Germany, have invented certain new and useful Improvements in Systems of Feeding Slow-Burning Stoves, of which the following is a specification.

The present invention relates to a system of feeding or fueling slow-burning stoves whereby the fuel-hearth is arranged above the feeding-shaft to allow of keeping the stock of fuel in a cool condition. In order to secure with a system of feeding of this kind an even and regular conveyance of burning material to the hearth, the present invention provides above the hearth a confining device arranged either in a fixed or adjustable position and against which the fuel is pressed or which is pressed against the fuel. By the pressure of the fuel against the confining device there is attained that the fuel is supplemented above the hearth at the same rate as it is consumed by the fire. In order to prevent a friction of the fuel against the walls of the feeding-shaft, it is recommendable to compose the latter of rings sliding one inside the other in telescope fashion, which offers at the same time the advantage in case the hearth is lowered toward the fuel-support that in spite of the great height of the filling or feeding shaft the lower stove does not require to be very high. In order to effect as far as possible an even conveyance of fuel to the fire from below, even with coals which easily bake, care must be taken that the fuel does not get too much heated at the top of the feeding-shaft, as otherwise there will be formed at the mouth of the feeding-shaft a firm ring of baked fuel which impedes the advance of the fuel. The formation of such a ring of baked fuel can easily be prevented by removing the end of the aperture in the grating, which is nearly also the boundary of the zone of combustion away from the inner mouth of the feeding-shaft. This can, for instance, be effected by strengthening the feeding-shaft at its upper edge or by inserting between the ends of the aperture in the grating and the mouth of the feeding-shaft an unbroken surface surrounding the feeding-shaft and the breadth of which is adapted to the nature of the fuel.

The invention is illustrated on the accompanying drawings in three forms of construction. In the stove, of which Figure 1 shows a longitudinal section through the middle, the fuel is advanced to the place of combustion, whereas Fig. 2 represents a stove where the hearth can be shifted along the stock of fuel.

In Fig. 1 of the drawings, *a* is the outer mantle of the stove with the feeding-door *b*, the opening of which is suitably connected by a closed passage *c* with the feed-opening of the fuel-shaft *d*, in which a door *e* has been provided. In the mantle *a* there are besides the door *b* several air-doors *f* and suitably also a few doors with mica-glass for allowing of watching the fire easily, also a few doors below the grate in order to remove any cinders. *g* is the fuel-support, which moves up and down in the feeding-shaft *d* and is held by a bar *h*, on which a weight *l* through rope *k*, running over pulley *i*, draws. The feeding-shaft consists of telescopic rings or sections, (indicated on the drawings by d' d^2 d^3.) The upper telescopic ring is much thicker at the top at *s* in order to keep the flame away from the mouth of the shaft. This is of great importance when baking coals are used, as such coals when coming near the zone of combustion bake together, so that a firm ring is formed which prevents the material underneath being pressed forward and out of the shaft when this ring projects into the mouth of the shaft. This drawback is prevented by the described thickened upper edge of the shaft or by inserting in evident manner an unbroken surface around the shaft between the ends of the slots in the grate and the mouth of the feeding-shaft. *m* is an abutment-plate serving to regulate the advance of the coal out of the feeding-shaft. *n* is the grate. *o* represents the holders of the feeding-shaft; but of course the feeding-shaft may also reach to the bottom or be otherwise supported. *p* is the dividing-plate, and *q* the ash-box. *r* is the outlet.

The stove works in the following manner: After the feeding-shaft *d*, through the doors *b e*, has been filled with coal a little beyond

its upper edge while the fuel-support g is in the position shown in the drawings a fire is lighted on the grate n. As soon as this has been well started some coal is put on it, whereupon the plate g is unfastened. When this has been done, the support g is raised by the drawing of the weight l, with which it is connected, until the fuel touches the abutment-plate m. In consequence of the gradient of the slope and the pressure of the abutment-plate on the fuel the latter is spread out over the grate and is supplemented in accordance with the consumption. By altering the positions of the adjustable abutment-plate the quantity of fuel on the hearth, and thereby the size of the fire, can be regulated in addition to the regulation of the same by altering the drafts. The stove will burn till all the coal in the feeding-shaft has been conveyed to the grate and been consumed. If now while the stove burns more coal is to be put in, the dividing-plate p is pushed into the feeding-shaft, whereby a further pressing of coal out of the feeding-shaft or a falling of fuel into the feeding-shaft is prevented. The feed-support g is then lowered and secured by means of a suitable device and the stove filled through the doors b e. After the filling the feeding device is again set going, so that the coal presses against the dividing-plate p. This plate is now drawn out, and the newly-filled stove keeps on burning.

The form of construction of the stove shown in Fig. 2 differs from the form in Fig. 1 in that in this case the grate is movable. The mantle of the stove is again marked with a, the telescope rings of the feeding-shaft with d' d^2 d^3, the feeding-doors with b e, the grate with n, the brackets supporting the feeding-shaft with o, the air-doors with f, the ash-box with q, the dividing-plate with p. The fuel-support is marked with g. Contrary to the form of construction shown in Fig. 1 the same is here arranged in a fixed position. The grate n is firmly united with the upper telescope ring d'. Between the inner edge of the slit in the grate and the edge of the feeding-shaft there is inserted an unbroken surface s, which is especially an advantage in the case of baking coal, as stated in the description of the form of construction shown in Fig. 1. m' is a pressure-plate which is pressed from above against the fuel. The pressure-plate m' is, contrary to the pressure-plate m in form shown in Fig. 1, arranged movably and is controlled by a weight l'. For a proper working of the stove it is necessary that the distance of the pressure-plate m' from the grates n should under normal circumstances remain unchanged. For this purpose is the pressure-plate m' joined with the upper telescope ring d' of the shaft by means of bent pieces of metal t fixed to both. The connection between the pressure-plate m' and the upper telescope ring d' through the bows t can be made to be adjustable, if this should be desirable, in order to regulate in this way the amount of fuel in the fireplace in a similar manner as with the construction shown in Fig. 1 by means of an adjustable arrangement of the plate m. The working of the stove is also with a movable grate quite similar to that of the stove illustrated in Fig. 1, with the difference that here the grate is moved onto the fuel instead of the fuel to the grate.

The lowering of the grate is effected in the case shown in the illustration by the weight l' pulling on the pressure or abutment plate m', which is firmly joined to the grate or to the upper telescope ring d', carrying the grate by means of the bows or crank-braces t. By pulling on the handle u the plate m' can be raised again after having descended, and thereby will the telescopic shaft be drawn out again at the same time, so that it can be refilled.

The forms of construction shown in the drawings may be modified in many ways without departing from the essential features of the invention. The arrangement and position of the grate in particular, as illustrated in the drawings, does not form an essential part of the system of stove-feeding for which this application is made. The grate, in fact, may be given any position and may, when circumstances require it, be transformed into a vertical annular grate. Instead of arranging the grate on the outside of the fuel-shaft it may be arranged inside, in which case as a rule an annular fuel-shaft will be provided. The advance of the fuel toward the fireplace may, besides weights, be effected by springs or other devices.

The essential advantage of the above-described system of feeding for slow-burning stoves is that the same allows the burning of the much cheaper glance-coal instead of the more expensive anthracite and, further, that only the material on the grate is burned.

A considerable practical advantage of this system lies further therein that a relighting may take place without emptying the feeding-shaft, as the processes on the grate are carried on quite independently and without any interference with the provision of fuel underneath the grate. Evidently the invention may not only be applied to stoves but also to furnaces, and wherever the word "stove" occurs the word "furnace" may be substituted.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The combination of a grate, a fuel-support below the grate, means to feed the fuel to the grate, and means for preventing excessive frictional interference by the lateral pressure of the fuel, for substantially the purposes set forth.

2. The combination of a grate, a fuel-support below the grate, means to feed the fuel

to the grate as it is consumed, and longitudinally collapsing or yielding lateral walls for preventing excessive frictional or jamming action of the fuel, for substantially the purposes set forth.

3. The combination of a grate, a fuel-support below the grate, means constantly applying pressure to feed the fuel onto the grate as it is consumed, and means for preventing excessive frictional interference by the lateral pressure of the fuel, for substantially the purposes set forth.

4. The combination of a grate, a fuel-support below the grate, an abutment-plate, means constantly applying pressure to feed the fuel between the abutment-plate and the grate as it is consumed, and means for preventing excessive frictional interference by the lateral pressure of the fuel, for substantially the purposes set forth.

5. The combination of a grate, a fuel-support below the grate, means constantly applying pressure to feed the fuel onto the grate as it is consumed, and longitudinally collapsible or yielding lateral walls for preventing an excessive frictional or jamming action of the fuel, for substantially the purposes set forth.

6. The combination of a grate, a fuel-support below the grate, an abutment-plate or stopping device, means constantly applying pressure to feed the fuel between the abutment-plate and the grate as it is consumed, and longitudinally collapsible or yielding lateral walls for preventing an excessive frictional or jamming action of the fuel, for substantially the purposes set forth.

7. The combination of a stove-mantle, provided with openings for admitting the air and for letting out the gases, a grate inside of the mantle, a feeding-shaft underneath the grate consisting of rings, each ring sliding inside of the adjoining upper one, a fuel-support for closing the lower mouth of the feeding-shaft, and means for moving one of said two parts, that is to say, the grate and the fuel-support, toward the other, for substantially the purposes set forth.

8. The combination of a stove-mantle, provided with openings for admitting the air and for letting out the gases, a grate immovably fixed inside of the mantle, a feeding-shaft underneath the grate, consisting of rings, each ring sliding inside of the adjoining upper one and a movable fuel-support for closing the lower mouth of the feeding-shaft, for substantially the purposes set forth.

9. The combination of a stove-mantle, provided with openings for admitting the air and for letting out the gases, a grate immovably fixed inside of the mantle, a feeding-shaft underneath the grate, consisting of rings, each ring sliding inside of the adjoining upper one, a movable fuel-support for closing the lower mouth of the feeding-shaft, and a stopping device above the said grate and feeding-shaft, for substantially the purposes set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EWALD ENGELS.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.