May 18, 1948. J. D. ROBINSON 2,441,845

AUTOMATIC AIR VOLUME CONTROL FOR STOKERS

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Fig. 1.

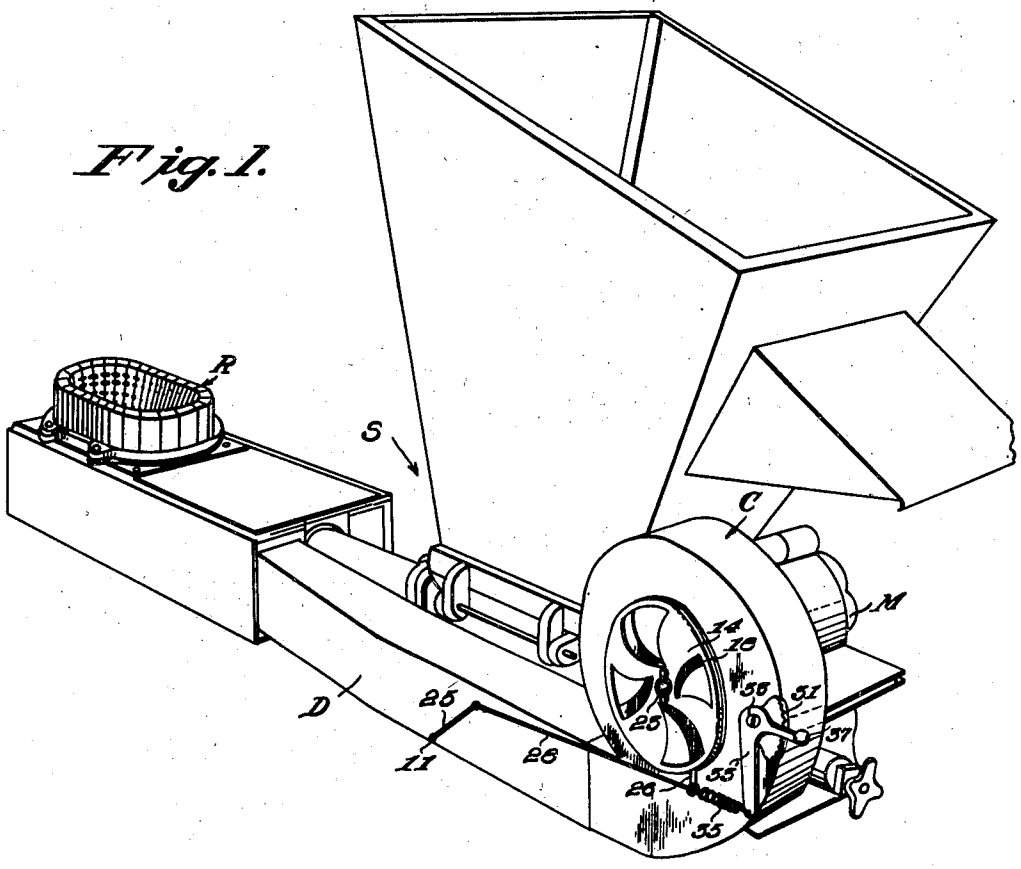
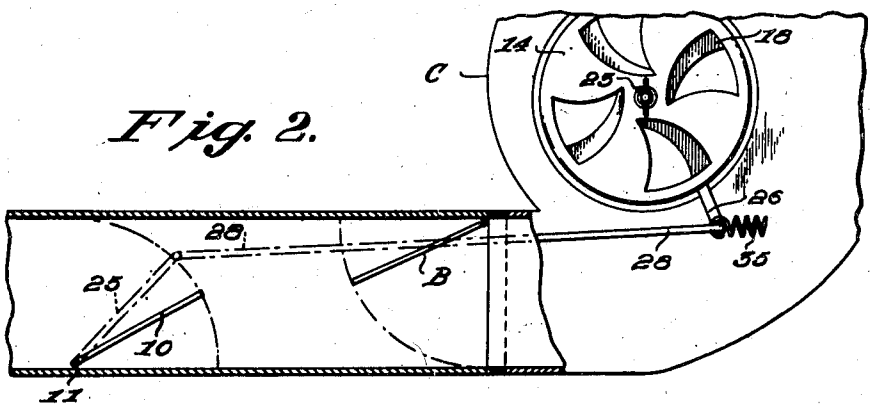


Fig. 2.



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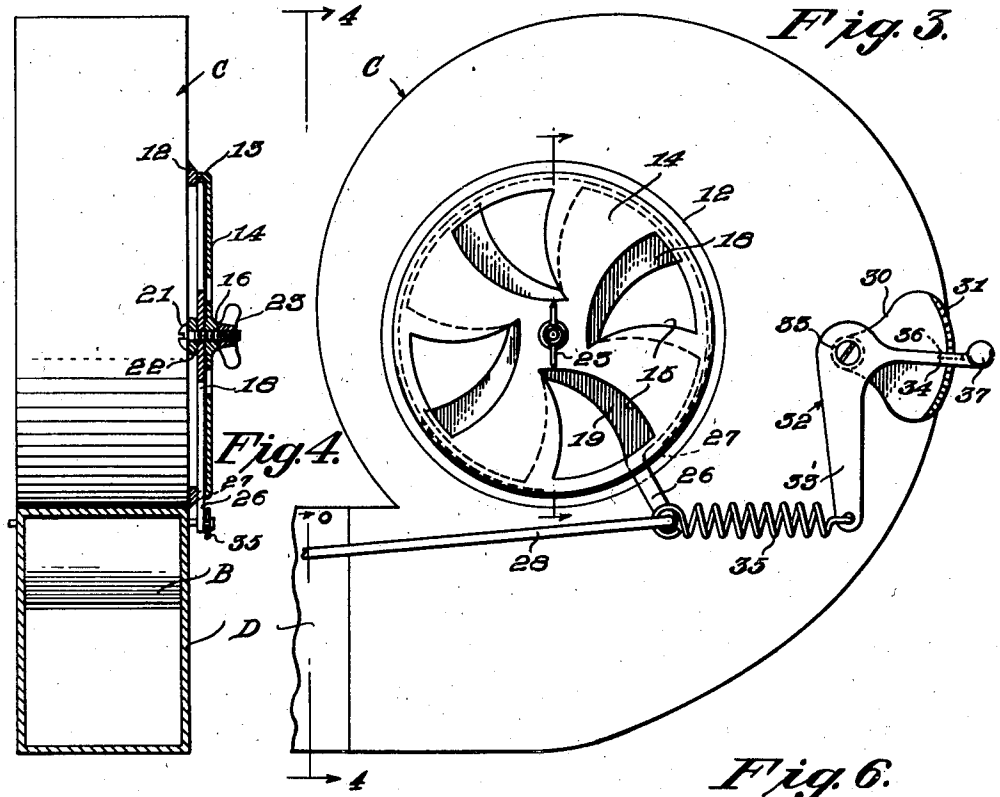


Fig. 3.

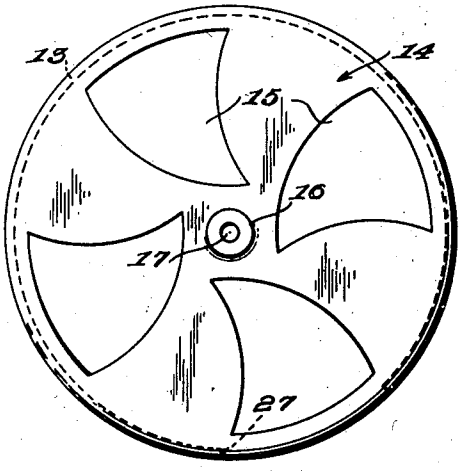


Fig. 5.

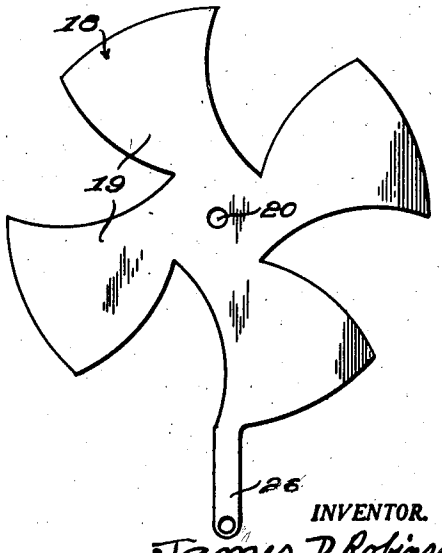


Fig. 6.

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UNITED STATES PATENT OFFICE

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AUTOMATIC AIR VOLUME CONTROL FOR STOKERS

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2 Claims. (Cl. 230—114)

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This invention relates to automatic air control means for stokers.

In the use of coal stokers the depth of fuel bed varies in accordance with the demand on the equipment and as is generally known, it is necessary for maximum efficiency of coal burning that air be provided in volumes corresponding to such varied depths of the fuel bed.

A primary object of the present invention is the provision of air control means operatively associated with a stoker for automatically supplying air in volumes commensurate with variations in the depth of the fuel bed whereby a maximum of heat will be obtained in the burning of the coal.

A further and more specific object of the invention is the provision of means in operative association with a constant speed fan which is automatically operative by the air velocity in an air duct connecting the fan with the combustion chamber for varying the volume of air delivered by the fan and through the duct in proportion to the variation of depth of fuel delivered to the combustion chamber by the stoker.

A further object of the invention is the provision of air control means of the character above referred to which is relatively simple in construction and which is adapted for installation at relatively low cost on existing stoker equipment with substantially little alteration of the structure thereof.

Other objects and advantages will be apparent from the following specification and drawings which disclose the preferred embodiment of the invention, and wherein:

Fig. 1 is a perspective view of a stoker disclosing the application of the present invention.

Fig. 2 is a broken side elevational view partially in vertical section disclosing the improved air control means.

Fig. 3 is an enlarged side elevational view of the stoker fan disclosing the application of the present invention.

Fig. 4 is a vertical section and elevation as observed in the planes of broken line 4—4 of Fig. 3.

Fig. 5 is a side elevational view of a damper disc for association with the fan.

Fig. 6 is a side elevational view of a damper shutter for association with the fan and the disc of Fig. 5.

Referring now in detail to the drawings, S designates a stoker which may be of any well known construction and which so far as the present invention is concerned, includes a retort

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R to which fuel is delivered and which is supplied with air delivered through a duct D by means of a fan disposed within a casing C. The fan casing C is in communication with the duct D and the fuel delivering means as well as the fan are driven by a motor M.

The present stoker equipment also includes a banking damper B for breaking the chimney pull on the fuel bed on the off cycle of the stoker.

The improved automatic air control means in accordance with a preferred embodiment of the present invention comprises an air volume control damper 10 disposed within the air duct D between the damper 13 and the retort R. The damper 10 is pivotally supported on a shaft 11 rotatably supported in opposite side walls of the duct D and the damper is movable from closed to open position as designated by the broken arcuate line in Fig. 2.

The fan casing C is provided with an air admission opening at one side thereof and such opening is surrounded by a ring 12 rigidly supported by the casing and rigidly connected to the outer face of the ring 12 by any desirable means is the flange 13 of a damper disc 14.

The damper disc 14 is provided with a plurality of air admission openings 15 and is further provided with an axial boss 16 which together with the body of the disc is apertured as at 17. Rotatably supported within the disc 14 is a damper shutter 18 which as indicated in Fig. 6 comprises a plurality of segments 19 for controlling the operative areas of the disc openings 15. The shutter 18 is centrally apertured as at 20 and the shutter is rotatably supported by the disc by means of a screw bolt 21 extending through the apertures 17 and 20. A washer 22 is preferably disposed between the head of the bolt and the shutter 18 and a thumb nut 23 is applied to the free end of the bolt, by adjustment of which proper freedom of rotation of shutter 18 can readily be attained.

An arm 25 has one end thereof secured to damper shaft 11 externally of the duct D and the shutter 18 is provided with an arm 26 which extends through a slot 27 in the flange 13 with the free end of arm 26 disposed below the damper disc 14. A rod 28 has its opposite ends pivotally connected to the arms 25 and 26 for simultaneous movement thereof as well as the damper 10 and the shutter 18.

A plate 30 is rigidly supported by the fan casing C and is provided with an arcuately disposed flange having notches or teeth 31.

A lever 32 is pivotally supported on the plate

30 as at 33, the lever including a substantially vertical arm 33' and a substantially horizontal arm 34.

A coil spring 35 has one end thereof suitably connected to arm 26 and rod 28 and the opposite end thereof connected with the free end of the arm 33.

The arm 34 is provided with a tooth 36 for selective engagement with the notches or teeth 31 and the arm is further provided with a ball finger gripping free end 37. The arm 34 is preferably yieldable to an extent to provide for adjustment upon tooth 36 riding over the teeth 31 or a rigid arm may be provided and the screw forming the pivot 33 slightly relieved when an adjustment is desired.

The operation of the improved air control means is as follows:

The tension in the spring 35 is adjusted by means of the lever 32 for maximum fuel burning efficiency in accordance with the particular stoker equipment and stack conditions, the spring acting through rod 28 and arms 25 and 26 to fully open the damper 10 and shutter 18 when the stoker is on the off cycle.

When the stoker is set into operation, with a consequent operation of the fan, a volume of air will be impelled through the duct D by the fan, and the velocity of such air will vary in accordance with the depth of the fuel bed. With a shallow fuel bed, which requires a substantially small volume of air for efficient burning, the velocity of the air will be substantially high whereby the damper 10 will be partially closed with a corresponding closing of the shutter 18 to provide the required relative small volume of air.

As the depth of the fuel fed increases, and in which a correspondingly increased volume of air is required, the air velocity, due to back pressure in the retort will be correspondingly diminished with a resulting opening of damper 10 and shutter 18 by means of spring 35 for providing the required increased volume of air. Thus it will be seen that the improved air control means is fully automatic and will operate to provide the required volume of air for maximum efficiency in fuel burning regardless of variations.

It is to be further noted that the structure is simple and is capable of being installed on existing stoker equipment with little alterations in the construction thereof.

While I have disclosed but a single specific embodiment of the invention, such is to be considered as illustrative only, and not restrictive, the scope of the invention being defined in the subjoined claims.

What I claim and desire to secure by United States Letters Patent is:

1. In combination, a fan housing in communication with one end of an air duct and having an air admission opening at one side thereof, a fan operatively supported within the housing for drawing air through said air admission opening and forcing it through said duct, a damper within the air duct pivotally supported thereby adjacent the bottom thereof, a shutter rotatably supported by the fan housing for controlling the admission of air to the opening therein, an arm connected with the damper adjacent the pivotal connection thereof and disposed externally of the duct, an arm rigid with the shutter, the first arm extending upwardly and the second arm extending downwardly with their free ends substantially horizontally alined, an elongated rod having opposite ends thereof movably connected with the free ends of said arms, a lever pivotally and adjustably supported by the fan housing and including a downwardly projecting arm, having its free end substantially horizontally alined with the free end of the shutter arm, and a coil spring disposed between said lever arm and said shutter arm with one end thereof connected to the free end of the lever arm and the other end thereof connected with the connection between said rod and said shutter arm.

2. The structure according to claim 1 wherein a damper disk having a plurality of air admission openings is disposed over the air admission opening in said housing, said disk having a peripheral cylindrical flange secured to said housing adjacent the perimeter of the air admission opening therein, and said shutter being rotatably supported by and within said disk with the arm thereof extending through a slot in said flange.

JAMES D. ROBINSON.

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