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DUST CATCHER VALVE AND VALVE OPERATING MECHANISM.

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1,401,052. Patented Dec. 20, 1921.

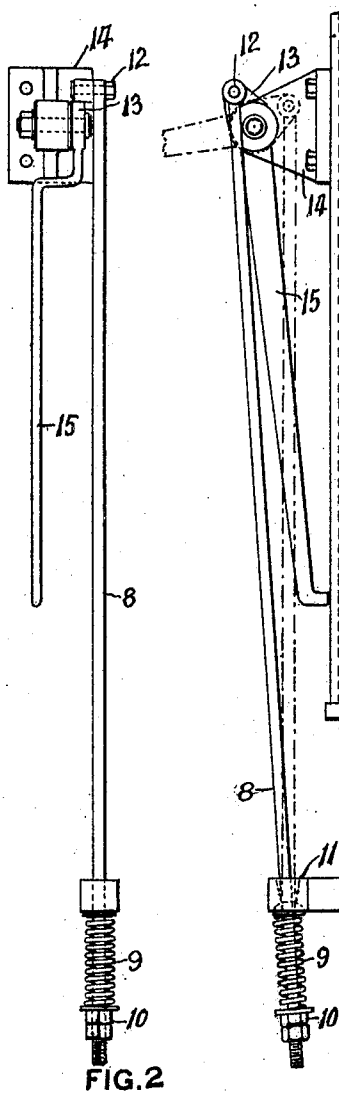

FIG. 2

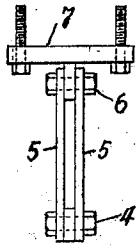

FIG. 3

FIG. 1

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DUST-CATCHER VALVE AND VALVE-OPERATING MECHANISM.

1,401,052. Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed February 7, 1920. Serial No. 356,813.

To all whom it may concern:

Be it known that I, ALFRED C. DANKS, a citizen of the United States, and a resident of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Dust-Catcher Valves and Valve-Operating Mechanism, of which the following is a specification.

This invention relates to the valves used on the dust catchers forming part of the gas mains of blast furnace plants.

Such dust catchers, as is known, are employed for the precipitation and collection of solid particles carried by hot gases, such as blast furnace and similar combustible gases.

The valves as formerly used in connection with such dust catchers have been held in position by means of a counter-weighted lever and clamps. This type of valve, when so used, presents the disadvantage that if the clamps are improperly fastened or are designedly loosened during times when a high pressure exists within the dust catcher, the valve will be blown open. Opening of the valve in such manner is dangerous as the heated contents of the dust catcher are violently expelled, with consequent risk of injury to the person operating the valve.

One object of the present invention is to provide a valve mechanism for use on dust catchers which is of positive operation and which avoids the use of separately adjustable securing means for the valve member, the valve being securely locked in position by a single operation.

A further object of the invention is to provide valve operating mechanism which may be actuated by an operator standing at a safe distance from the discharge orifice of the dust catcher.

In the accompanying drawings Figure 1 is a side elevation of a dust bell showing the valve and valve operating means, and indicating in dotted lines the alternative position of the valve operating means; Fig. 2 is a front elevation of the valve operating means; and Fig. 3 is a rear elevation of the valve supporting means.

In the drawings, the numeral 1 indicates a dust catcher for use in a gas flue, having therebeneath the conical valve 2 for controlling a pressure relief and dust discharge orifice in the bottom of the dust bell.

To the valve 2 is connected a lever arm 3 having at one extremity a pivotal connection 4 with a link 5, which is in turn pivotally connected at 6 with a bracket 7 secured to the body of the dust catcher. Through the lever arm, adjacent its other extremity, passes the controlling rod 8 which extends downwardly past the lever arm. Surrounding the controlling rod 8 is a helical spring 9 which bears against a nut 10 on the controlling rod and against the under face of the lever arm 3. The orifice 11 in the lever arm 3 through which the controlling rod passes is flared in order to permit swinging movement of the controlling rod relatively to the lever arm.

At its upper extremity, the controlling rod 8 has a pivotal connection 12 with a rock lever 13, which is rotatably mounted in a bracekt 14 secured to the dust bell 1. The rock lever 13 is provided with a throwing arm 15.

In the closed position of the valve, the controlling means are in the position shown in full lines in Fig. 1 of the drawings. In this position, the helical spring 9 bears against the lever arm 3 and holds the valve 2 in tightly closed position. The controlling rod 8 is swung outwardly from the dust catcher 1 and past the dead center of the rock lever 13 so that is cannot be moved inwardly toward the catcher, other than by operation of the rock lever. The lower extremity of the throwing arm 15, by contact with the dust catcher 1, limits the outward movement of the rock lever 12 and controlling rod 8.

It will be readily seen that the valve is locked in its closed position beyond possibility of accidental displacement when the rock lever 12 has once been thrown past its dead center. An excessive pressure within the dust catcher beyond the strength of the spring 9 can cause only such slight opening of the valve as will serve to reduce the pressure within the dust catcher below the point at which the spring will restore the valve to tightly closed position.

When it is desired to open the valve for the relief of pressure within the dust catcher or the discharge of accumulated dust therefrom, the throwing arm 15 is pulled outwardly into the position shown in the dotted lines in Fig. 1 of the drawings. This may be effected by an operator standing at a safe distance from the dust catcher and using a long bar or other tool of any convenient form.

With the rock lever 13 and controlling rod 8 in their dotted line positions, the controlling rod will extend a greater distance below the lever arm than when in its outwardly swung, full line, position. The distance between the nut 10 on the operating rod and the lever arm 3 will thus be increased sufficiently to release the spring 9 from its condition of tension and permit the valve 2 to open to a predetermined extent.

It will be obvious that the degree of tension under which the spring normally acts, and the degree to which the valve is permitted to open, may be varied by varying the position of the nut 10 on the operating rod 8 and other advantages will be apparent to those skilled in the art.

What I claim is:

1. In a dust catcher, the combination with a dust collecting chamber, said chamber having a discharge outlet, of a valve for closing said discharge outlet, a pivoted lever on said valve, a valve controlling rod, spring means on said controlling rod arranged to bear against said pivoted lever for maintaining said valve in closed position, and means for varying the position of said controlling rod to relieve the tension of said spring means in opening said valve.

2. In a dust catcher, the combination with a dust collecting chamber, said chamber having a discharge outlet, of a valve for closing said discharge outlet, a pivoted lever on said valve, a valve controlling rod, spring means on said controlling rod arranged to bear against said pivoted lever for maintaining said valve in closed position, and means for actuating said controlling rod, said means comprising a rock lever adapted to swing the end of said rod to opposite sides of its center of rotation, and thereby vary the tension of said spring means in opening and closing said valve.

3. In a dust catcher, the combination with a dust collecting chamber, said chamber having a discharge outlet, of a valve for closing said discharge outlet, a pivoted lever on said valve, a valve controlling rod, spring means between said valve and said controlling rod and arranged to maintain said valve in closed position, and a rock lever connected with said controlling rod and arranged to be actuated for varying the position of the controlling rod to relieve the tension of said spring means and permit opening of said valve.

4. In a dust catcher, the combination with a dust collecting chamber, said chamber having a discharge outlet, of a valve for closing said discharge outlet, a pivoted lever on said valve, a valve controlling rod, spring means on said controlling rod and arranged to bear against said lever for maintaining said valve in closed position, and a rock lever connected with said controlling rod and arranged to be actuated for varying the position of the controlling rod to relieve the tension of said spring means and permit opening of the valve.

5. In a dust catcher, the combination with a dust collecting chamber, said chamber having a discharge outlet, of a valve for closing said discharge outlet, a pivoted lever on said valve, a valve controlling rod having its lower end extending through a suitable aperture in said pivoted lever, a spring member mounted on the lower end of said rod and arranged to bear against the under side of said pivoted lever for maintaining said valve in closed position, and a rock lever mounted on said pressure reservoir and connected with the upper end of said controlling rod adapted to swing the end of said rod to opposite sides of its center of rotation and thus decrease and increase the tension of said spring means to open and close said valve.

6. In a dust catcher, the combination with a dust collecting chamber, said chamber having a discharge outlet, of a valve for closing said discharge outlet, a pivoted lever on said valve, a valve controlling rod, yielding means on said controlling rod arranged to engage said pivoted lever in maintaining said valve in closed position and means for varying the position of said controlling rod to relieve the pressure on said yielding means in operating said valve.

7. In a dust catcher, the combination with a valve for closing said dust catcher against internal pressure, of a controlling rod and means for actuating said rod comprising a rock lever adapted to swing the end of the rod to opposite sides of its center of rotation, and thereby lock the rod in said positions, said rod being adapted to hold said valve closed when swung to one side of its center of rotation, and to permit said valve to open when swung to the other side of its center of rotation.

In testimony whereof I have hereunto set my hand.

ALFRED C. DANKS.

Witnesses:
L. C. EDGAR,
G. E. F. GRAY.