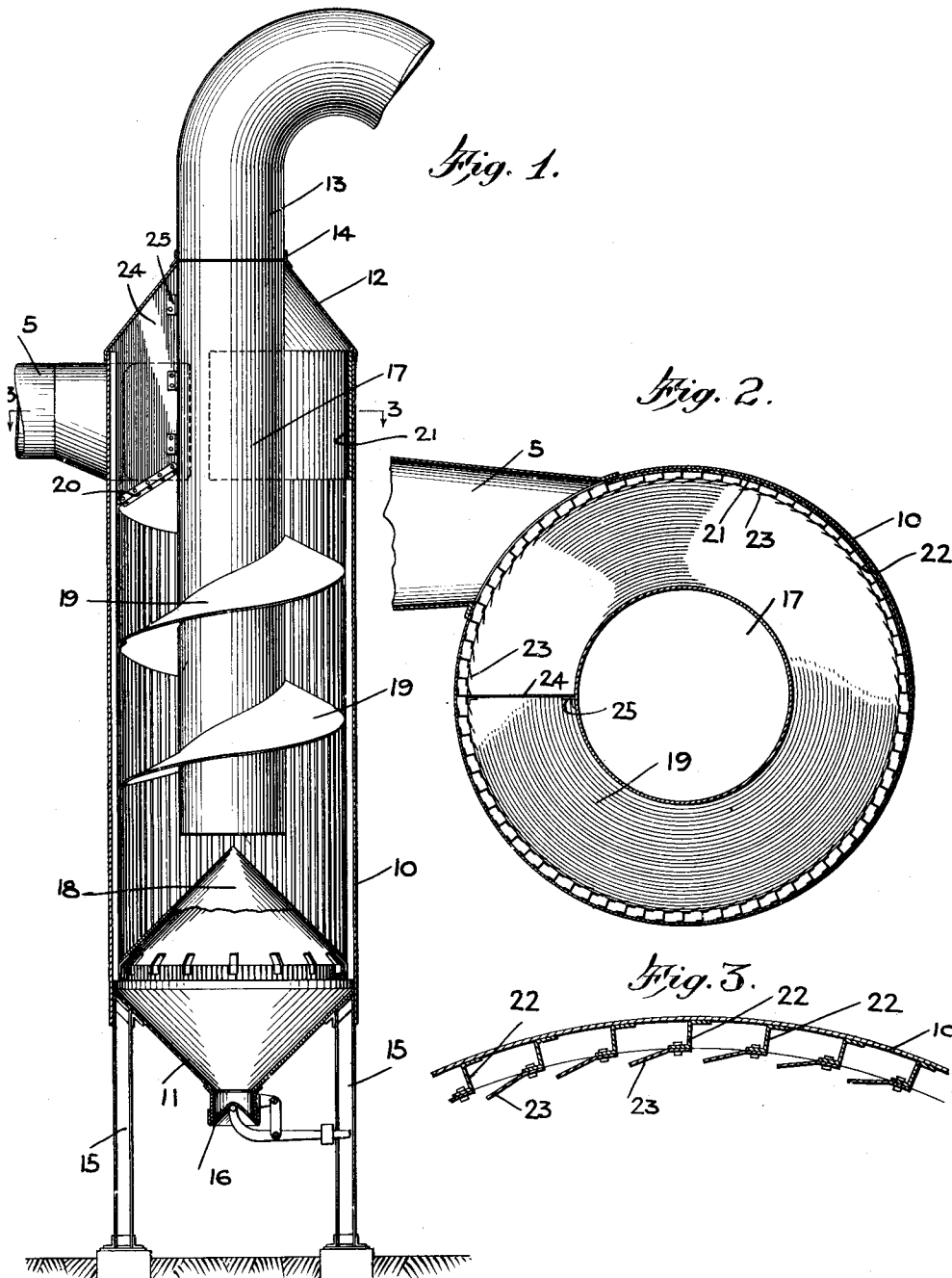


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 DRY GAS CLEANER.
 APPLICATION FILED MAY 24, 1912.

1,055,792.

Patented Mar. 11, 1913.



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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALBERT F. PLOCK, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Dry Gas-Cleaner, of which the following is a full, clear, and exact description.

This invention relates to a structure especially adapted for dry-cleaning gases, particularly blast furnace gases, in an efficient and economical manner.

As a result of the coaction of air and coke and ore in a blast furnace, gases are formed, which gases are of value in heating the furnaces, for use in explosive engines, or, in fact, many different uses, since the heat units present in such resulting gases are high. However, such furnace gas contains considerable dust which renders it necessary to clean the gas before the same can be utilized for heating or power purposes.

The design of the present invention is the production of a dry gas cleaner of improved construction and tending to the more economical separation of the dust from the gas, the construction of the cleaner being such that the amount of dust per cubic foot of gas after passing through such cleaner is materially and substantially reduced.

It is also a design of the present invention to provide a dry gas cleaner characterized by a construction in the nature of pockets which will receive the dust from the whirling gas, due to centrifugal force, the said pockets conducting the dust to a suitable receptacle in position for withdrawal in a dry condition.

It is also a design of the present invention to provide a dry gas cleaner characterized by construction which will insure a definite amount of travel of the gas through the cleaner before the gas is admitted to the flue or outlet.

Other advantages, not particularly now set forth, will appear as the description of the preferred embodiment of the structure proceeds, the new and useful features characterizing such structure being set forth and included within the claims.

Reference is to be had to the accompanying drawings, forming part of this speci-

cation, in which similar characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a vertical sectional view of the dry gas cleaner; Fig. 2 is a sectional view on the line 3—3 of Fig. 1; Fig. 3 is an enlarged detailed sectional view, showing the construction of the pockets adjacent the periphery of the cleaner.

The dry gas cleaner is adapted to be connected to a dust catcher which is positioned between the cleaner and the furnace, any suitable and desirable form of flue connecting the furnace and the dust catcher, while another flue extends between the catcher and the cleaner.

Referring particularly to Figs. 1 and 2, wherein the detailed construction of the preferred form of the cleaner is illustrated, it will be noted that the main body of the cleaner consists preferably of a cylindrical shell 10 closed at the bottom by the inverted conical pocket 11 and at the top by the conical closure element 12 having an opening extending therethrough to receive a flue 13, held in position in any suitable and desirable manner, preferably by means of angle irons or plates 14. The main body 10 of the cleaner may be supported in position by any suitable structure or framework, the preferred form embodying vertically extending columns 15 of suitable height so that the valve 16, which closes the bottom of the main body member, may be in position for convenient manipulation. Extending vertically within the main body of the cleaner and secured in any suitable manner therein, and preferably at the central position thereof, is a vertically extending passageway 17 which may be conveniently formed of sheet metal; the lower open end of this passageway or flue is adjacent the apex of the conical structure 18 adjacent the bottom of the body of the cleaner, the inclined sides of the cone being particularly adapted for a purpose to be hereinafter set forth.

Referring particularly to Fig. 2, it will be noted that the flue 5 adjacent the upper end of the cleaner, which flue receives the gas or gases from the preceding element of the outfit, communicates tangentially with the body of the cleaner so that gases passing through

the said flue and into the cleaner will travel therethrough in a whirling manner, due to the velocity of the gases, this whirling being promoted by means of the inclined and spiral plate 19 surrounding the outside of the flue or passageway 17 and terminating adjacent the lower open end thereof, the upper end of this spiral plate being adjacent the opening in the side of the main body 10 which communicates with the said flue 5; the plate is secured at its ends in any suitable and desirable manner, preferably by means of angle irons 20 secured to the parts by means of rivets. Since the hot gases entering the cleaner through the flue 5 possess considerable velocity, the inside of the main body 10 of the cleaner opposite the opening of the said flue is provided with a hardened steel plate 21 which extends around substantially one quarter of the periphery of the cleaner, this plate taking up any effect in the nature of a sand blast, due to the particles of dust or other material retained within the gas, and being in such position that it may be easily and quickly replaced when worn.

Secured to the inside of the body 10 of the cleaner and spaced apart substantially equal distances, which distance, however, is variable, are a number of Z-bars 22, one of the parallel sides of each bar carrying an angularly extending plate 23, as shown particularly in Figs. 2 and 3, it being noted that each one of these plates extends in a direction opposite to the direction of travel of the gas or dust through the cleaner.

The Z-bars extend from the bottom of the main body of the cleaner adjacent the lower end portion of the cone 18 to a point below the said removable plate 21 opposite the opening of the flue 5, some of the Z-bars, especially those adjacent the end of the spiral plate 19, being different in length and terminating adjacent the end of this plate, as shown particularly in Fig. 1. It will be noted that the spaces between the Z-bars form pockets which extend substantially throughout the height of the spiral plate and which communicate with the inverted cone structure 11 at the bottom of the cleaner; it will be further noted that while the inclined spiral plate extends around the flue or passageway 17, the outer edge portion of such spiral plate is adjacent the outer ends of the Z-bars or the angularly extending plates 23 so that, as the gas whirls downwardly through the cleaner, the dust and particles contained therein will be caught within the pockets between the Z-bars and, under the influence of gravity, will fall down into the pocket formed by the said inverted cone 11; the inclination of the spiral plate assists the catching of the dust in the pockets since under the influence of gravity the dust will tend to roll down the

plate and will, under the further influence of gravity, fall through the pockets between the Z-bars, finally coming to rest in the inverted cone structure 11.

By referring to the element 19 as a spiral plate, it is understood that such term means a substantially continuous plate extending around the flue 17, the projection of such plate on the flue forming substantially a helix; the use of the term "inclined" in defining this spiral plate means, as clearly seen in Fig. 1, that the outer edge portions of the plate lie in different planes than the corresponding inner edge portions of the plate, the result being that the projection of the outer edge portion on the flue will generate a second helix on the said flue, separated from the first one for a distance which will depend upon the inclination of the said plate. The particular function of this inclined feature is that the force of gravity acting on the solid particles present on the plate will cause them to roll down adjacent the pockets between the Z-bars 22 adjacent the outer edge portion of the plate.

From a consideration of the structure shown and described, it is apparent that the cleaner set forth tends to a simple and efficient method of removing dust and particles from gases; the provision of the pockets with the outwardly or angularly extending plates 23 provide traps which receive the dust and particles, due to centrifugal force, the provision of the downwardly inclining spiral plate tending also to easily bring about an accumulation of the dust in the bottom of the cleaner under the influence of the force of gravity. The parts of the cleaner which come into contact with the hot gases, and especially those parts which receive the impact of the particles due to the velocity of the gases, are made of material to successfully withstand such impact for a longer or shorter time, such material being preferably hardened steel, the structure, however, being such that elements thereof may be easily and quickly replaced in the event of wear from such causes.

In order to insure the travel of the hot gases throughout the length of the spiral plate 19, a vertical plate 24 is preferably made use of, this plate being positioned adjacent the top of the cleaner, as shown particularly in Fig. 1, being secured in position to the flue 17 in any desirable manner, as by means of angle irons 25. This plate prevents the hot gases from passing down the adjacent side of the cleaner, making it necessary for the gases to circulate around the flue.

Various changes may be made in the size and material of the different parts in order to set forth an efficient structure, such changes not involving a departure from the inventive idea disclosed.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:—

1. A gas cleaner having a tangential inlet, 5
a flue serving as an outlet, the entrance of the flue being remote from the said inlet, means whereby the gases must pass through a certain distance before entering the flue, the said tangential inlet imparting a whirling 10
movement to the gas when passing through the cleaner, a number of longitudinally extending Z-bars within the cleaner, one side of each bar being provided with a longitudinally extending plate, the end of 15
which, with the next adjacent Z-bar, forms a pocket, the said pockets receiving and conducting away the dirt and foreign matter trapped therein from the gas due to the whirling movement thereof through the 20
cleaner.

2. A gas cleaner embodying a shell, the lower end thereof being provided with a pocket, the upper end of the shell being provided with an inlet to one side of the central 25
axis, whereby incoming gases have a whirling movement imparted to them, a longitudinally extending flue within the shell, the lower end of the flue being open and being

remote from the inlet, a number of peripheral pockets adjacent the inside of the shell, 30
the said pockets being included between angularly formed plates extending longitudinally of the shell, the direction of extent of each plate being opposite the direction of 35
travel of the gases passing through the cleaner, an inclined spiral plate between the inlet and the entrance to the flue, a cone above the pocket at the bottom of the cleaner, the apex of the cone being adjacent 40
the lower end of the flue, the spiral plate forming a definite path which the gases must take in their passage from the cleaner, the force of gravity bringing particles on 45
the plate into the said pockets due to the inclination of the plate, and the inclined surface of the cone receiving and conveying the dust and foreign matter to the said pocket at the bottom of the shell in position for removal.

In testimony whereof I have signed my 50
name to this specification in the presence of two subscribing witnesses.

ALBERT F. PLOCK.

Witnesses:

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G. C. SURGERS.