

Aug. 7, 1923.

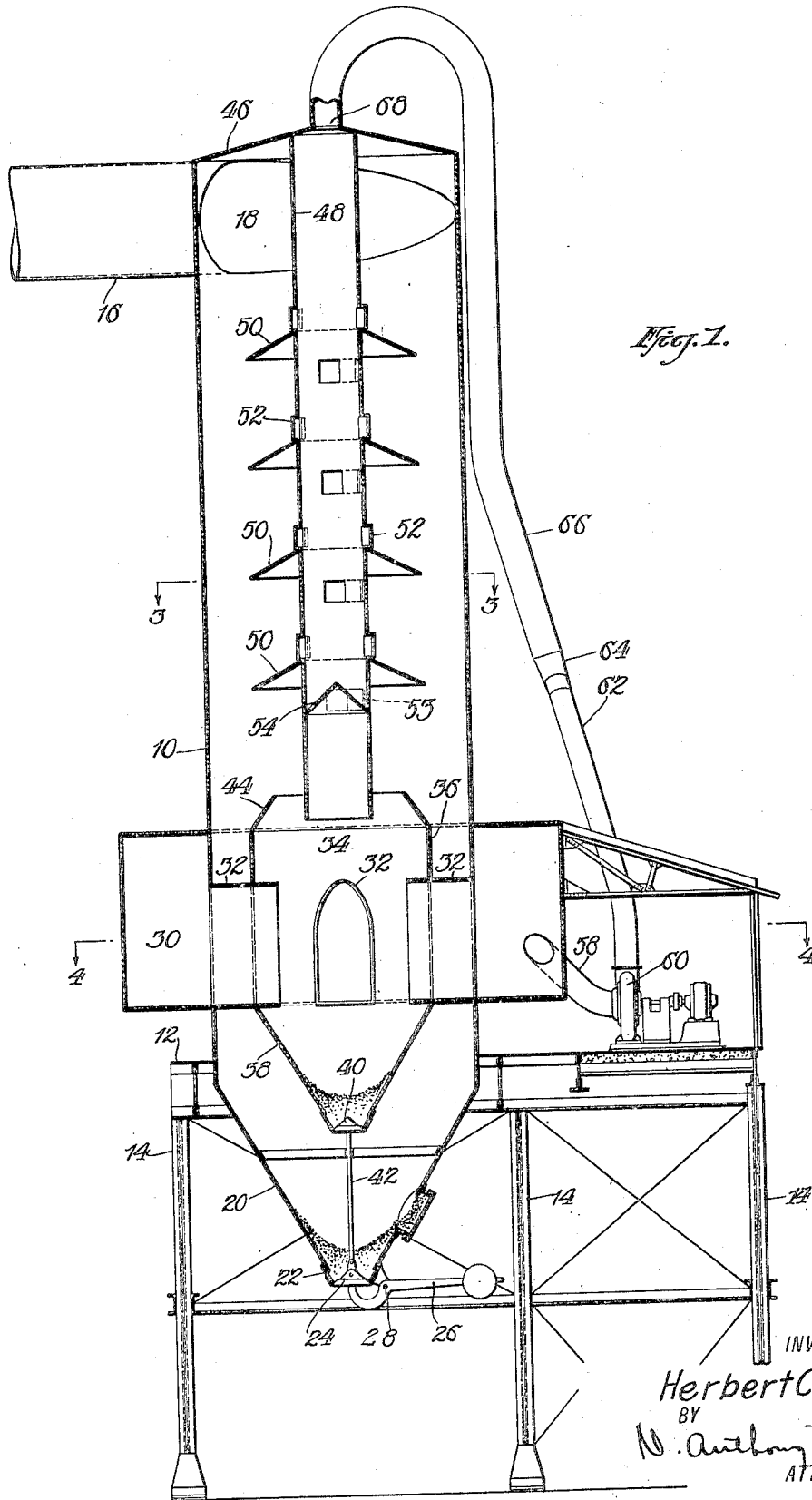
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H. C. RYDING

GAS CLEANER

Filed Jan. 26, 1922

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Fig. 2.

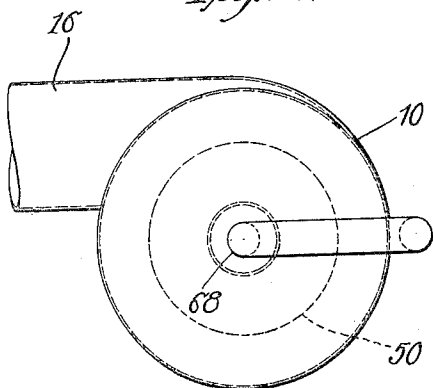


Fig. 3.

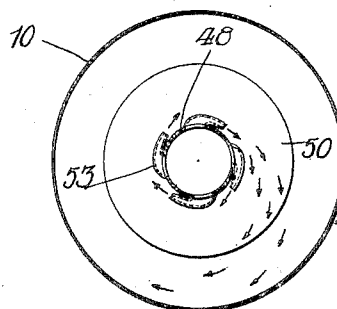
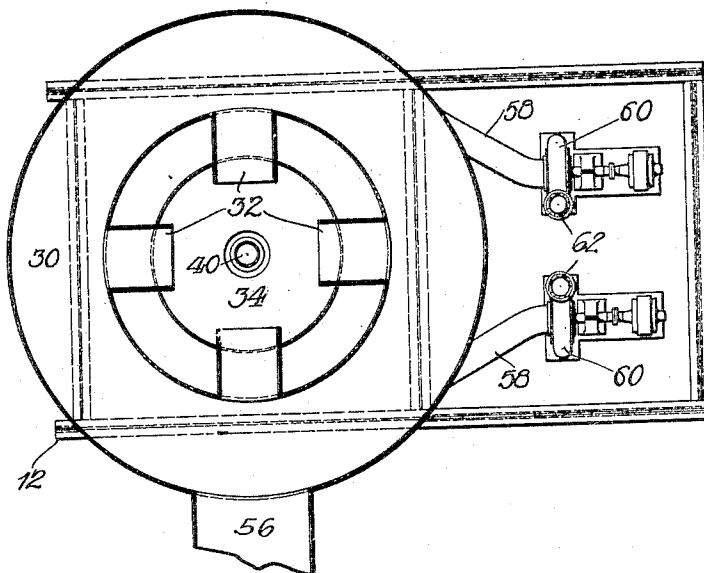


Fig. 4.



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HERBERT C. RYDING, OF BIRMINGHAM, ALABAMA.

GAS CLEANER.

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To all whom it may concern:

Be it known that I, HERBERT C. RYDING, a citizen of the United States, and resident of Birmingham, Alabama, have invented certain new and useful Improvements in Gas Cleaners, of which the following is a specification.

This invention relates to improved means for cleaning gas and is particularly designed for removing the particles of iron, lime and coke which are held in suspension in the form of dust by gases issuing from blast furnaces.

The invention consists broadly in providing improved means for imparting a whirling motion to the dirty gas so that the dust particles will be thrown outwardly by centrifugal force thus leaving an inner stratum of comparatively clean gas. Means are provided for conveying the clean gas to a separate chamber and a portion of the clean gas is introduced through a central pipe extending through the center of the gas cleaning chamber. This pipe is provided with a series of nozzles which direct the clean gas outwardly in a tangential direction from said pipe so as to cause a whirling motion of the dirty gas contained in the cleaning chamber.

One embodiment of the invention is illustrated in the accompanying drawings in which—

Fig. 1 is a longitudinal vertical section through the cleaner;

Fig. 2 is a top plan of a portion of the cleaner;

Figs. 3 and 4 are horizontal sections taken respectively on the lines 3—3 and 4—4 of Fig. 1.

The shell 10 of the cleaner is supported on a platform 12 made up of suitable structural shapes, said platform being carried by a plurality of columns 14. The dirty gas enters the cleaner from a pipe 16, through an opening 18, in the shell 10, which is so located that the pipe 16 extends tangentially outward from the shell. The bottom of the shell is tapered to form a hopper 20, to the lower end of which is secured a casting 22 forming a valve seat for a belt valve 24 which is carried by a counterweighted lever 26 pivoted at 28 to a suitable lug formed on the casting 22. Surrounding a lower portion of the shell 10 is a bustle chamber 30 which is constructed of sheet metal plates and provided with radially extending con-

duits 32 which communicate with the interior of a central chamber 34 which is partially enclosed by the cylindrical wall 36. A tapered hopper 38 is secured to the wall 36 and is provided with a bell valve 40 which is connected by means of a rod 42 with the valve 24 above referred to. The upper end of the wall 36 is inclined inwardly as at 44 for a purpose to be later referred to.

The top of the shell 10 is closed by a roof or dome 46 from which extends a central pipe 48. This pipe carries a plurality of deflectors 50. Above each deflector is located a plurality of nozzles 52 which are arranged to discharge clean gas under pressure in a direction substantially tangent to the central pipe, as indicated by the dotted arrows in Fig. 3. Near the lower end of the pipe 48 is secured a diaphragm 54 of conical shape which is adapted to close the end of the pipe.

The bustle chamber 30 is provided with a large outlet pipe 56 for clean gas. This chamber is also connected by means of pipes 58 with blowers 60, the pipes 58 being connected to the suction end of said blowers. Pipes 62 leading from the discharge end of the said blowers unite in a fitting 64 which is connected to a pipe 66, said pipe being connected at 68 to the top of the central pipe 48.

In operation dirty gas under pressure enters the tangential inlet 16 at the top of the shell, and due to this tangential entrance, the gas is given a rotary motion in addition to being propelled downward through the cleaner, and this rotary motion is accelerated by the clean gas which is discharged from the nozzles 52 thereby causing the gas to travel in approximately a helical path through the interior of the shell 10. The dust particles being of higher specific gravity than the gas are thrown outwardly by centrifugal force against the interior surface of the shell 10. The dust laden gas then travels downward partly by gravity and partly due to the pressure of the gas until it encounters the tapered portion 44 of the cylindrical wall 36. At approximately this location the gas flows inward and through the lateral conduits 32 into the bustle chamber and the dust drops down into the hopper 20. A small proportion of the clean gas is by-passed through the pipes 58 and 66 forcibly discharged

through the nozzles 52 at a high velocity thus serving to accelerate the whirling movement of the dust laden gas through the cleaner. The deflectors 50 carried by the central pipe prevent any chimneying effect of the gas that might be set up by the centrifugal force which tends to create a zone of low pressure in the center of a cleaning chamber through which the unclean gas would rush directly from top to bottom if not prevented from so doing by said deflectors.

The conical diaphragm secured near the bottom of the central pipe 48 in addition to closing the lower end of said pipe also makes it self-cleaning as any small amount of dust which tends to accumulate therein will roll down the inclined surface of said diaphragm and be blown out through the lowermost set of nozzles 53.

The major portion of the dust precipitated will be caught by the lower hopper 20. However, to take care of any small amount of dust which may be precipitated when the gas takes the double turn which is necessary to pass the last deflector 50, and the inclined baffle 44, I provide a top hopper 38 arranged to accumulate the small quantity of dust which will be carried by the clean gas. The dust from the hopper 38 will be periodically discharged into the hopper 20 when the weight of the dust in either hopper overcomes the weight of the counterweighted lever 26 and causes the bells 40 and 24 to drop in a manner well known in this art.

Though I have described with great particularity the details of the embodiment of the invention herein shown, it is not to be construed that I am limited thereto as changes in arrangement and substitution of equivalents may be made by those skilled in the art without departing from the invention as defined in the appended claims.

What I claim is:

1. A gas cleaner comprising a shell forming a cleaning chamber having spaced ports for admission and eduction of gas, means within said shell utilizing jets of gas previously passed through said cleaner to impart centrifugal rotation to the gas while traversing said chamber, and means for the removal of the dust collected in said chamber.

2. A gas cleaner comprising a shell forming a cleaning chamber having spaced ports for admission and eduction of gas, means for discharging within said shell at a multiplicity of points gas which has previously passed through said shell to impart centrifugal rotation to the gas while traversing said chamber, and means for the removal of the dust collected in said chamber.

3. A gas cleaner comprising a shell form-

ing an elongated cleaning chamber having ports for the admission and eduction of a stream of gas to be cleaned, a pipe extending axially into said chamber and having tangential nozzles, means for conveying cleaned gas from said cleaning chamber and means for forcing said cleaned gas at high velocity through said pipe and nozzles to impart a whirling motion to the gas stream as it flows through said chamber, and means for the removal of the dust collected in said chamber.

4. A gas cleaner comprising a shell forming a cleaning chamber, having connected therewith an inlet pipe for dirty gas and an outlet pipe for clean gas and a pipe extending into the cleaning chamber having a plurality of tangential outlets through which clean gas which has previously passed through said cleaning chamber is discharged at a high velocity to impart a whirling motion to the gas supplied to the cleaning chamber so that the dust particles will be centrifugally thrown to the interior surface of the shell.

5. A gas cleaner comprising a shell forming a cleaning chamber having connected therewith a tangential inlet pipe for dirty gas, a bustle chamber surrounding a lower portion of said shell and communicating with the interior thereof, a dust hopper at the lower end of said shell, a central pipe extending lengthwise into said shell and having a plurality of outlets, and means for drawing a volume of clean gas from said bustle chamber and forcing it through the outlets in said central pipe to impart a whirling motion to the gas in said cleaning chamber.

6. A gas cleaner comprising a shell forming a cleaning chamber having connected therewith a tangential inlet pipe for dirty gas, a bustle gas chamber surrounding a lower portion of said shell and communicating with the interior thereof, a dust hopper at the lower end of said shell, a central pipe extending lengthwise into said shell and having a plurality of nozzles, pipes connecting the bustle chamber with said central pipe and a blower for drawing gas from said bustle chamber and discharging it through said nozzles at a high velocity to impart a whirling motion to the gas in said cleaning chamber.

7. A gas cleaner comprising an outer shell forming a cleaning chamber having a dust hopper secured to the lower end thereof, a bustle chamber surrounding a lower portion of said shell, an inner shell in juxtaposition to said bustle chamber and located within the cleaning chamber, lateral conduits connecting said inner shell with the bustle chamber, a central pipe extending downwardly through the cleaning chamber and terminating a short distance above said lateral con-

duits, a series of deflectors carried by said central pipe, outlet nozzles carried by said central pipe and means for forcing clean gas from said bustle chamber through said nozzles to accelerate the whirling movement of the dust laden gas through the cleaning chamber of said gas cleaner.

8. A gas cleaner comprising an outer shell forming a cleaning chamber, an inner shell having an inwardly inclined baffle wall formed thereon, an inner dust hopper below said baffle wall to retain the dust recovered from the cleaned gas, a central pipe extending through the cleaning chamber and a short distance into said inner shell beyond said baffle wall so as to form a restricted passageway for the cleaned gas, a series of deflectors secured to said central pipes, a series of outlet nozzles through which comparatively clean gas is discharged to impart a whirling motion to the dust laden gas in said cleaning chamber.

9. A gas cleaner comprising an outer shell forming a cleaning chamber, an inner shell having an inwardly inclined baffle wall formed thereon, an inner dust hopper below said baffle wall to retain the dust recovered from the cleaned gas, a central pipe extending through the cleaning chamber and a short distance into said inner shell beyond

said baffle wall so as to form a restricted passageway for the cleaned gas, a series of deflectors secured to said central pipe, a series of outlet nozzles through which comparatively clean gas is discharged to impart a whirling motion to the dust laden gas to said cleaning chamber, a conical bottom for closing the lower end of said central pipe, a bustle chamber for clean gas, a pipe connecting the upper end of said central pipe with the discharge side of a blower and another pipe connecting said chamber with the suction side of said blower so that a continuous flow of cleaned gas is maintained through said nozzles to accelerate the whirling movement of the dust laden gas through the cleaner.

10. A gas cleaner including a cleaning chamber, a chamber for cleaned gas, an inlet pipe for dust laden gas entering said cleaning chamber at a tangent so as to impart a whirling motion to the dust laden gas, a pipe extending into the cleaning chamber having a plurality of outlet nozzles and means connected with said chamber for cleaned gas for forcing cleaned gas through said nozzles to accelerate the whirling movement of the dust laden gas.

In witness whereof I have hereunto signed my name.

HERBERT C. RYDING.