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H. KREISINGER

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DUST COLLECTOR

Filed Oct. 11, 1924

2 Sheets-Sheet 1

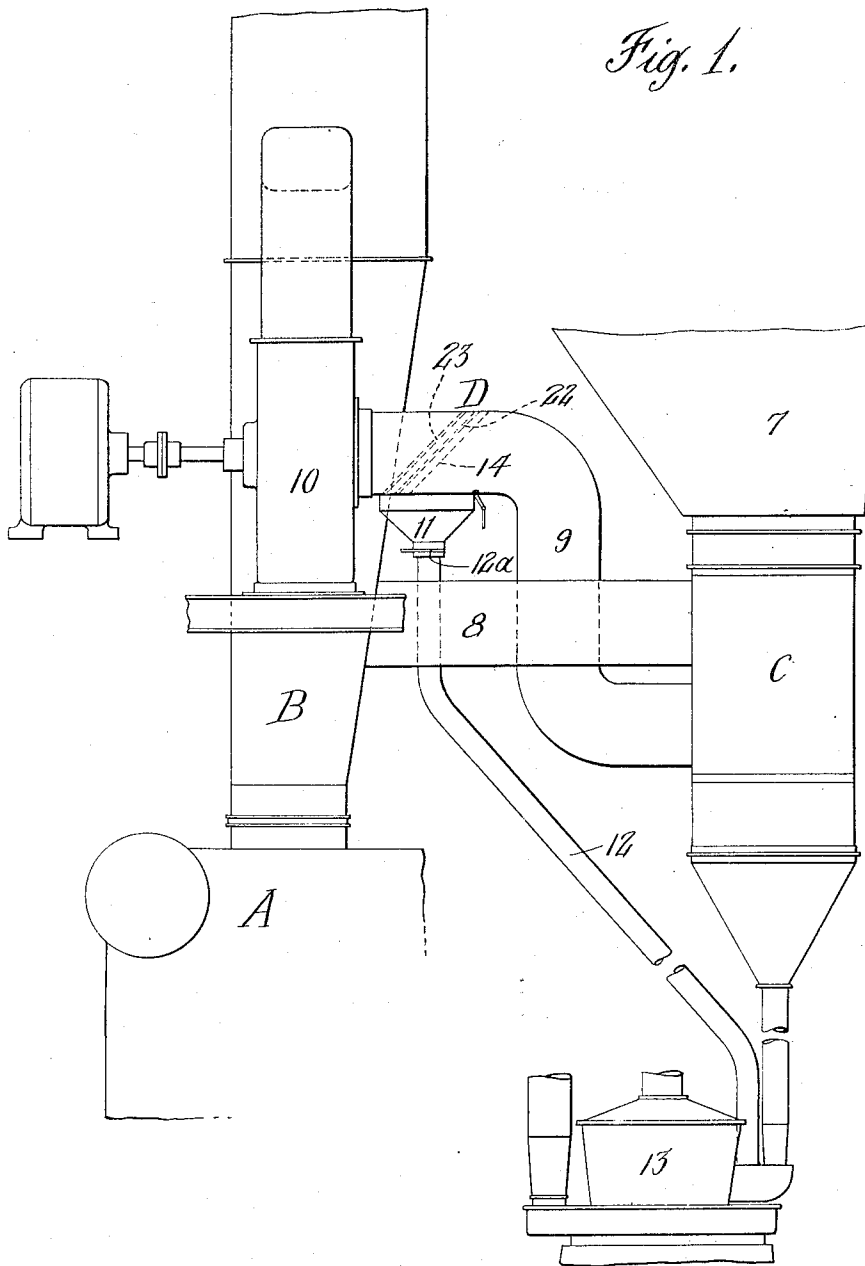


Fig. 1.

INVENTOR  
*Henry Kreisinger*  
BY  
*Symestvedt + Lechner*  
ATTORNEYS

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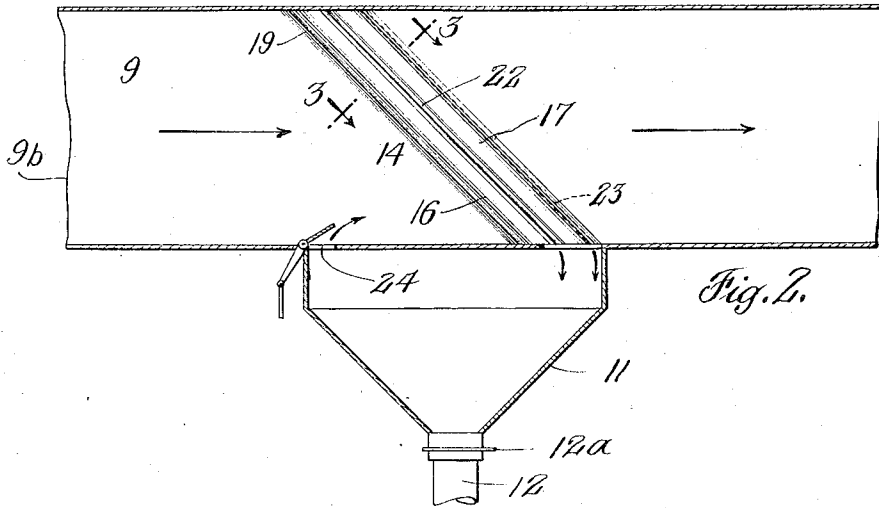


Fig. 2.

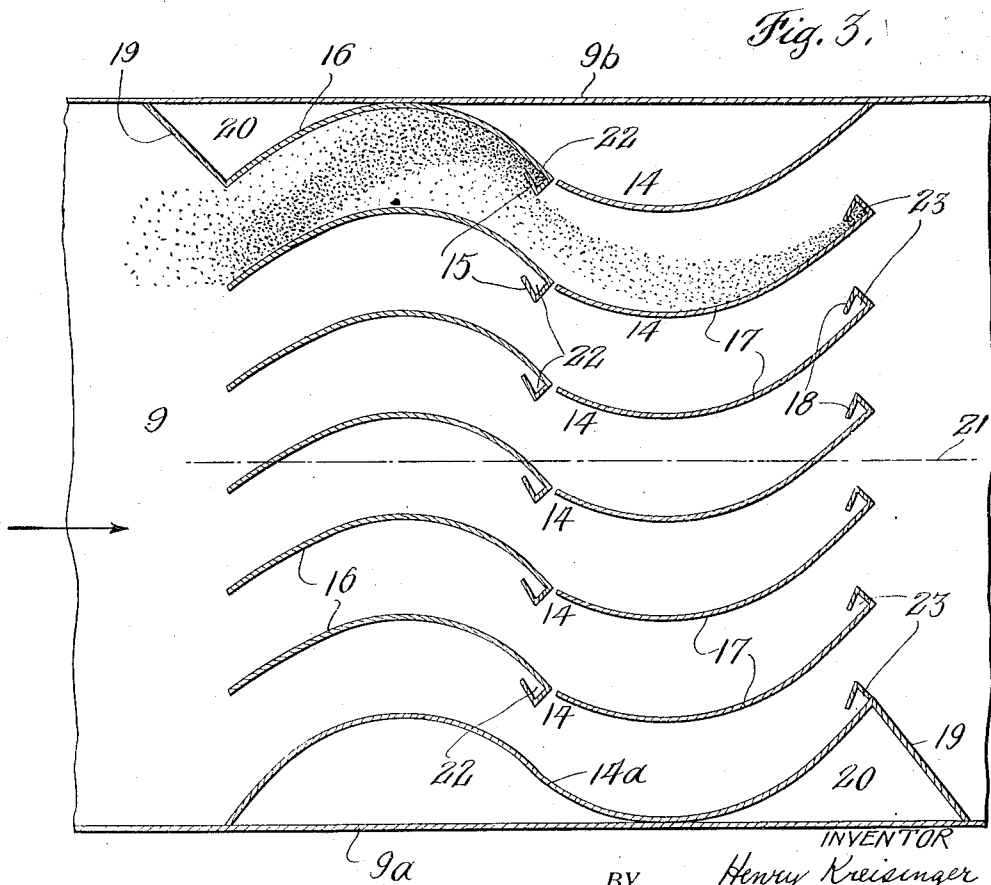


Fig. 3.

INVENTOR  
BY Henry Kreisinger  
Symmett & Lechner  
ATTORNEY

## UNITED STATES PATENT OFFICE

HENRY KREISINGER, OF PIERMONT, NEW YORK, ASSIGNOR TO COMBUSTION ENGINEERING CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

## DUST COLLECTOR

Application filed October 11, 1924. Serial No. 742,977.

This invention relates to dust collectors and particularly to the removal and recovery of coal dust carried in suspension with flue gases after such gases have been passed thru a coal drier. I aim to catch the dust in an economical and convenient manner, to minimize the pressure drop thru the dust collector as compared to the pressure drop in existing devices for the purpose known to me, and to provide a device which can be used in association with the existing flue of a pulverized fuel burning installation without material changes being made.

How these and other advantages can be realized thru my invention will appear from the description hereinafter of the best construction known to me for carrying out the invention in practice.

In the drawings Fig. 1 is a more or less diagrammatic elevational view of a pulverized fuel preparing and burning installation with my invention applied thereto.

Fig. 2 is an enlarged vertical section of a portion of the duct, dust collector and hopper.

Fig. 3 is a cross section taken on line 3—3 of Fig. 2 on an enlarged scale.

In the installation diagrammatically shown in Fig. 1 a portion of the furnace is indicated by the reference letter A, the stack or flue by the letter B, and the coal drier by the letter C. Coal is fed from the suitably elevated bin 7 thru the drier C which functions to dry the coal by means of the flue gases introduced thereinto thru the duct 8. The gases after intermingling with the coal as it passes thru the drier are discharged or exhausted thru the duct 9 by means of an exhauster 10, said duct having located in a horizontally disposed portion the dust collector D to be hereinafter fully described. The coal after leaving the drier C passes to the mill 13 where it is pulverized and subsequently delivered to the burners (not shown) of the furnace A. The drier may be of any suitable construction.

The dust which is caught by the collector D discharges by gravity into the hopper or receptacle 11 from whence it may be delivered to any convenient point in the plant

for economical disposition. In this instance I have shown the dust as being delivered, by means of pipe 12, provided with a valve or gate 12a, to the pulverizer mill 13. While I have shown the dust collector D in this instance consisting of but one set of dust catching members it is to be understood that a plurality of such sets might be used arranged one in advance of the other, the number thereof being determined by the degree of dust elimination desired.

As the construction and disposition of the plates making up the dust catching or collecting unit forms an important part of my invention a detailed description thereof will here follow.

The dust collector consists of a series of spaced ogee shaped blades or partitions 14, in this instance each blade being made up of two plates one of which is concave and the other convex, with the exception of the blade 14a adjacent the side 9a of the duct 9, which is one continuous ogee curved plate. Such construction of the blades makes for convenient hook-like crimping of the edges 15 of the plates 16, which edges are substantially at the point of union of the convex and concave portions of the blades or partitions. The other plates 17 are similarly crimped at their edges 18, that is at the ends of the ogee blades toward the exit end of the gases passing thru the spaces formed by the spaced blades. Shields 19 are provided to prevent any dust from pocketing in the spaces 20 behind the plates adjacent the sides 9a and 9b. As an alternate method of construction the blades could be made of metal strips of ogee cross section with the pockets riveted or otherwise secured thereto.

The blades are positioned in the duct 9 at an angle preferably about 45° and in such relation to the sides 9a and 9b thereof that their general plane indicated by the dot and dash line 21 is substantially parallel with the sides. In other words the broad sides of the blades are presented to the sides of the duct. Thus it will be seen by so positioning the plates and by virtue of the spacing thereof that a more or less unrestricted passage is offered to the gases, the only appreciable re-

striction being that caused by the curved and hooked portions of the blades, and this is not great.

The dust laden gas in passing through the collector in the direction of the arrow is given a curved path due to the shape of the blades. For the purpose of illustrating the result achieved I have shown in one of the channels or spaces between blades a stippled representation of the course of the dust from which it will be seen that the dust collects toward and closely hugs the concave side of the channel by which it is guided into the pocket 22. This is primarily due to the centrifugal force which develops by virtue of the curved course which the dust laden gases are compelled to take.

The pocket 22 formed by the hook-like crimping hereinbefore described is angularly disposed and extends from the top to the bottom of the duct 9. When it is appreciated that the dust particles are very light and in suspension, it will be understood that all of the dust may not be directed into the pockets 22. The unpocketed dust on continuing its travel is deflected back to the blade which it struck on entering, this time however striking the blade at its concave portion and being directed into the pocket 23 formed at the end of such blade. As stated above the pockets are similar, one being on the surface of the ogee blade facing toward one side of the duct 9 and the other being on the opposite surface and facing toward the other side of the duct. The gas itself is turned in its course to pass out thru the space left between two adjacent blades.

By virtue of the crimped edge or pocket extending the full length of the blade and extending from the top of the duct to the bottom thereof, the collected dust slides down by gravity in to a hopper or receptacle 11 located adjacent the lower end of the pockets, in which it is collected for distribution as hereinbefore described. Some gas may also pass with the dust into the hopper which gas is returned to the duct thru a damper controlled opening 24. This gas may carry some of the dust along with it but this without destroying the effectiveness of the device because they again flow through the dust catcher before passing out of the flue.

The effectiveness and efficiency of a dust collector constructed in accordance with my invention will be fully realized when it is understood that due to the small restriction presented to the natural flow of the gas, the pressure drop will be relatively low in comparison to existing separators such as the "cyclone separator" now in common use.

While I have shown and described my invention in connection with a preparing and burning installation for coal and as located in a duct between a drier and exhauster it is to be understood that the advantages of the

invention might be realized for separating other materials or even in other locations.

From the above description it will be seen that the simple construction of my invention lends itself to application to existing ducts without material changes to the duct system of the installation.

I claim:

1. A dust collector comprising, in combination, a conduit through which the fluid from which dust is to be removed may be passed, a dust receiver, dust collecting means in said conduit delivering to said receiver, and means whereby any gaseous fluid which may pass into the receiver with the dust is returned to the conduit rearwardly of the collecting means.

2. A dust collector comprising, in combination, a conduit through which the fluid from which dust is to be removed may be passed, a dust receiver, communicating means between the receiver and the conduit at points spaced longitudinally of the latter, and dust collecting means in said conduit delivering to the receiver by one of said communicating means, another of said communicating means being adapted to return fluid from the receiver to the conduit rearwardly of the collecting means.

3. A dust collector comprising, in combination, a conduit through which the fluid from which dust is to be removed may be passed, a dust receiver, communicating means between the receiver and the conduit at points spaced longitudinally of the latter, and dust collecting means in said conduit delivering to the receiver by one of said communicating means, another of said communicating means being adapted to return fluid from the receiver to the conduit rearwardly of the collecting means, said collecting means including channel members extending diagonally forwardly and downwardly, with relation to the fluid flow, to the communicating means through which they deliver.

4. A dust collector comprising, in combination, a conduit through which the fluid from which dust is to be removed may be passed, a dust receiver, communicating means between the receiver and the conduit at points spaced longitudinally of the latter, and dust collecting means in said conduit delivering to the receiver by one of said communicating means, another of said communicating means being adapted to return fluid from the receiver to the conduit rearwardly of the collecting means, said collecting means including means for effecting a sinuous flow of the fluid in the conduit so as to throw the dust laterally and channel members positioned to catch said dust and extending downwardly to the communicating means through which they deliver.

In testimony whereof, I have hereunto signed my name.

HENRY KREISINGER.