Feb. 1, 1944. S. HOLM ET AL 2,340,592

DUST SEPARATOR

Filed Jan. 5, 1943

Fig. 1

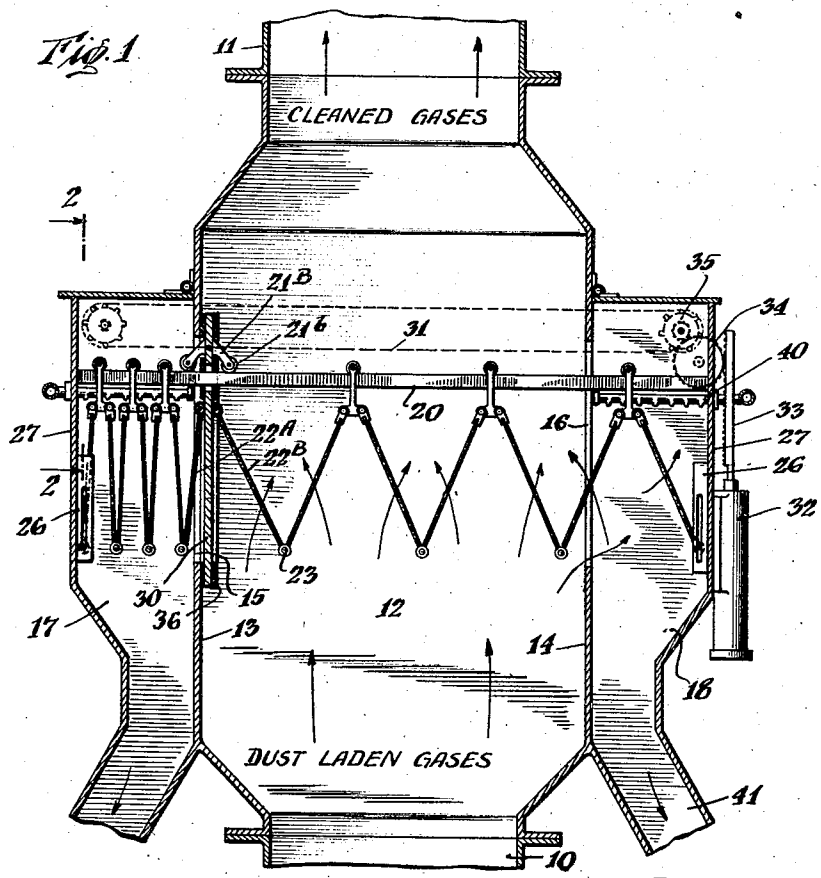


Fig. 2

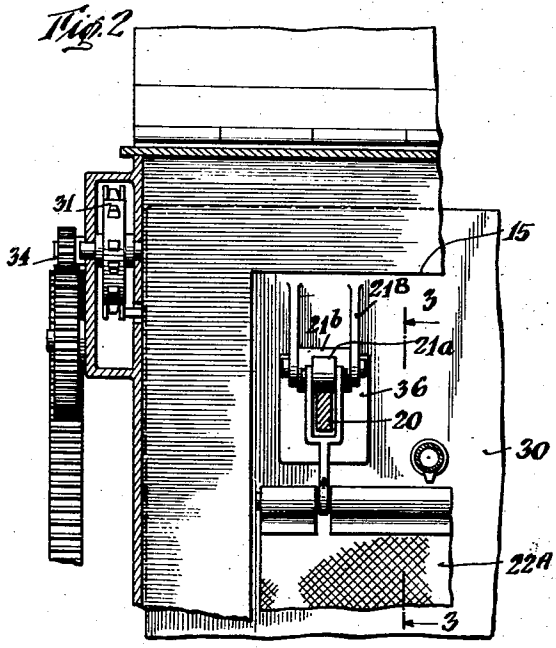
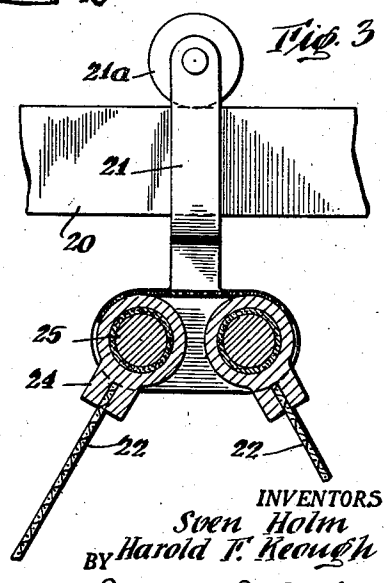


Fig. 3



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Patented Feb. 1, 1944

2,340,592

UNITED STATES PATENT OFFICE

2,340,592

DUST SEPARATOR

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Application January 5, 1943, Serial No. 471,336

4 Claims. (Cl. 183—57)

The present invention relates to dust separators and particularly to an improved movable filtering screen of the type periodically cleansed of dust accumulations.

In carrying out the invention a filtering screen is disposed in zig-zag arrangement across a gas duct and is of such length that part of it may be retracted at intervals from the gas duct into a chamber at the side of the latter to be cleaned of dust accumulations by subjecting it to air jets or the like. The invention will be best understood upon consideration of the following detailed description of an illustrative embodiment thereof when read in conjunction with the accompanying drawing in which:

Figure 1 is a diagrammatic elevational view, partly in section, of a dust separator embodying the present invention;

Figure 2 is a fragmentary sectional view on the line 2—2 in Figure 1 showing part of the operating means for traversing the filtering screen across the gas duct; and

Figure 3 is a fragmentary view on an enlarged scale of part of a carriage and track for supporting the screen for movement across the duct.

In the drawing, the numerals 10 and 11 designate two vertically alined sections of a gas duct between which is interposed a dust separating chamber 12 of somewhat greater width than the duct. The opposite side walls 13 and 14 of chamber 12 are formed with alined openings 15, 16, each communicating with a recess or subsidiary chamber 17, 18 at either side of the main chamber 12 into which parts of the filtering screen are alternately drawn for cleaning.

Extending completely across the chamber 12 and into the recesses 17 and 18 at either side thereof are several tracks, of which one is shown in Figure 2, on which tracks 20 for guiding a plurality of carriages 21 equipped with rollers 21*a* for traversing the filtering screen into and out of the cleaning recesses 17, 18. The filtering screen comprises a plurality of reticulated filter panels 22 of suitable form pivotally connected in pairs at their lower ends 23 and attached at their upper ends to collars 24 rotatably mounted on pins 25 carried by the carriages 21 to form a collapsible or folding screen disposed in zig-zag arrangement across the path of gases flowing through the cleaning chamber 12. The last panel 22 at either end of the screen is guided at its lower end edges in guides 26 mounted on the end walls 27 of the auxiliary chambers 17, 18. Near the middle of the screen adjacent panels designated 22A and 22B are connected at their upper ends to a door or closure 30 suspended from a carriage 21B equipped with rollers 21*b* riding on track 20, all as shown at the left of Fig. 1. A chain 31 it attached to carriage 21B for traversing the panels 22 of the filter screen. Any suitable type of motor may be used for operating the chain 31 to traverse the screen panels 22; Fig. 1 shows a pneumatic motor 32 having a piston provided with a rack 33 for operating the gearing 34 to drive the shaft on which the chained sprockets 35 at the right hand side are fixed. As appears in Fig. 2, the door 30 is formed with an opening through which the track 20 passes so that the door may be slid along the track. A sealing member 36 is provided on the door to wipe against the track to minimize seepage of either dust or cleaning air therethrough.

In operation the dust-laden gases flowing from the duct section 10 into the chamber 12 deposit dust particles on the screen panels 22 and the cleansed air is discharged into the duct section 11. At suitable intervals the motor 32 is placed in operation and acts through the chain 31 and the carriage 21B to move the door 30 from the left hand side of the chamber 12, for example, to the right hand side until it covers the opening 16 to the auxiliary chamber 18. In this movement of the door 30 the screen panels 22 which had been located in the path of the gases are moved into the chamber 18 at the right hand side where the dust may be blown from the screen by compressed air admitted to pipe 40 which has a plurality of nozzle apertures directed downwardly to project jets of air against the screen panels and cause the dust thereon to be removed and discharged through the outlet 41. The initiation and termination of operation of motor 22 to effect the carriage movements as well as the starting and cutting off of the air jet may be controlled by a suitable timing device.

At the same time that the filter panels 22 which had been exposed to the dust-laden gases are moved into the chamber 18 at the right hand side of the duct, the sections of the screen which was previously located behind door 30 within chamber 17 are withdrawn so that a number of the panels 22 move with the door 15 and are extended to become disposed in the main chamber 12 in the path of dust-laden gases. Thus certain of the filter panels are exposed to the dust-laden gases for a period and then moved out of the main chambers into one of the cleaning chamber 18 to have the dust purged therefrom while their place in the main chamber 12 is taken by other filter panels moved into place from the subsidiary chamber 17 at the opposite side of the dust, this sequence of operation continuing indefinitely. When panels which are laden with dust are moved into one or the other of the subsidiary chambers 17 or 18, the door 30 cuts off communication between the main chamber 12 and the chamber into which the dirty panels are located and thus seals it so that the jets of air are confined to the screens and do not escape into the main chamber. A corollary of this feature is that because the

subsidiary chambers 17 and 18 communicate directly with the main chamber 12 through the openings 15, 16, respectively, the filter panels 22 located in the subsidiary chamber 18 which at any particular time is open to the main chamber 12 are also available for filtering dust from the gases. Consequently a somewhat larger amount of filtering surface is utilized than would be the case if only the width of the duct of the main chamber 12 in alignment with the duct were available for accommodating the active filter panels.

What we claim is:

1. In a dust separator; a main chamber interposed in a duct through which dust-laden gases flow and having vertical side walls that define opposite sides of said chamber formed with alined openings; means forming auxiliary chambers at opposite sides of said main chamber in communication with the interior thereof through said openings; a guide track extending across said main chamber and into the auxiliary chamber at either side thereof; a filter screen disposed transversely of the main chamber in a plurality of zig-zag folds in the path of gases passing through said chamber, said screen being of such length that a plurality of folds are disposed in each of said auxiliary chambers while the remaining folds are disposed across the path of the gases in the main chamber; carriages mounted on said track, means for supporting said screen on said carriages; means for moving said carriages to withdraw folds of the screen that are disposed across the main chamber into an auxiliary chamber at one side thereof while at the same time withdrawing a plurality of screen folds from the other auxiliary chamber and disposing them in the path of gases flowing through the latter; and pneumatic means in each auxiliary chamber for removing dust from the parts of the screen disposed therein.

2. In a dust separator; a main chamber interposed in a duct through which dust-laden gases flow and having vertical side walls that define opposite sides of said chamber formed with alined openings; means forming auxiliary chambers at opposite sides of said main chamber in communication with the interior thereof through said openings; a guide track extending across said main chamber and into the auxiliary chamber at either side thereof; a filter screen disposed transversely of the main chamber in a plurality of zig-zag folds in the path of gases passing through said chamber, said screen being of such length that a plurality of folds are disposed in each of said auxiliary chambers while the remaining folds are disposed across the path of the gases in the main chamber; carriages mounted on said track, means for supporting said screen on said carriages; means for moving said carriages to withdraw folds of the screen that are disposed across the main chamber into an auxiliary chamber at one side thereof while at the same time withdrawing a plurality of screen folds from the other auxiliary chamber and disposing them in the path of gases flowing through the latter; pneumatic means in each auxiliary chamber for removing dust from the parts of the screen disposed therein; and means for closing the opening leading from said main chamber into one of said auxiliary chambers upon retraction of dust-laden screen parts into the latter.

3. In a dust separator; a main chamber interposed in a duct through which dust-laden gases flow and having vertical side walls that define opposite sides of said chamber formed with alined openings; means forming auxiliary chambers at opposite sides of said main chamber in communication with the interior thereof through said openings; a guide track extending across said main chamber and into the auxiliary chamber at either side thereof; a filter screen disposed transversely of the main chamber in a plurality of zig-zag folds in the path of gases passing through said chamber, said screen being of such length that a plurality of folds are disposed in each of said auxiliary chambers while the remaining folds are disposed across the path of the gases in the main chamber; carriages mounted on said track, means for supporting said screen on said carriages; means for moving said carriages to withdraw folds of the screen that are disposed across the main chamber into an auxiliary chamber at one side thereof while at the same time withdrawing a plurality of screen folds from the other auxiliary chamber and disposing them in the path of gases flowing through the latter; pneumatic means in each auxiliary chamber for removing dust from the parts of the screen disposed therein; and closure means movable with said screen to cover the opening between said main chamber and the auxiliary chamber into which dust-laden screen folds are retracted.

4. In a dust separator; a main chamber interposed in a duct through which dust-laden gases flow and having vertical side walls that define opposite sides of said chamber formed with alined openings; means forming auxiliary chambers at opposite sides of said main chamber in communication with the interior thereof through said openings; a guide track extending across said main chamber and into the auxiliary chamber at either side thereof; a filter screen disposed transversely of the main chamber in a plurality of zig-zag folds in the path of gases passing through said chamber, said screen being of such length that a plurality of folds are disposed in each of said auxiliary chambers while the remaining folds are disposed across the path of the gases in the main chamber; carriages mounted on said track, means for supporting said screen on said carriages; means for moving said carriages to withdraw folds of the screen that are disposed across the main chamber into an auxiliary chamber at one side thereof while at the same time withdrawing a plurality of screen folds from the other auxiliary chamber and disposing them in the path of gases flowing through the latter; pneumatic means in each auxiliary chamber for removing dust from the parts of the screen disposed therein; and closure means movable back and forth across the main chamber with said screen for closing one or the other of the openings leading from said main chamber into said auxiliary chamber to prevent communication between the latter and said main chamber while permitting gases from the main chamber to enter the other auxiliary chamber through the opening communicating therewith to flow over the screen folds disposed in said auxiliary chamber as well as said main chamber.

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