Aug. 9, 1927. 1,638,141

J. F. BOLLING

AIR FILTER DRIVE

Filed Sept. 25. 1926

Fig. 1.

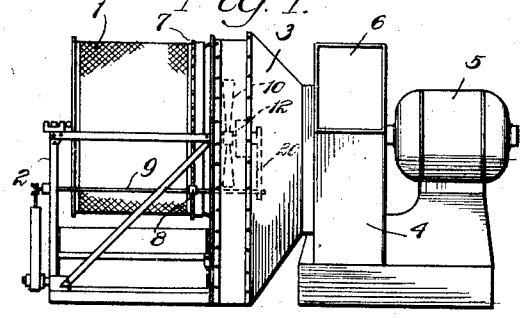


Fig. 2.

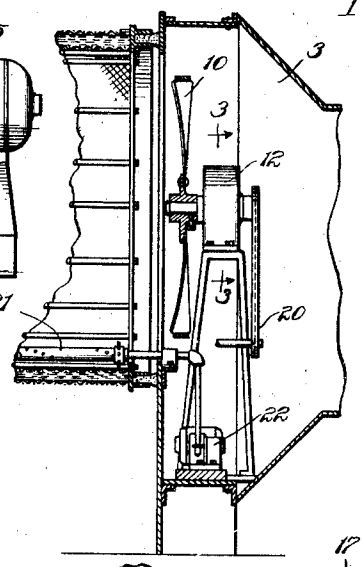


Fig. 3.

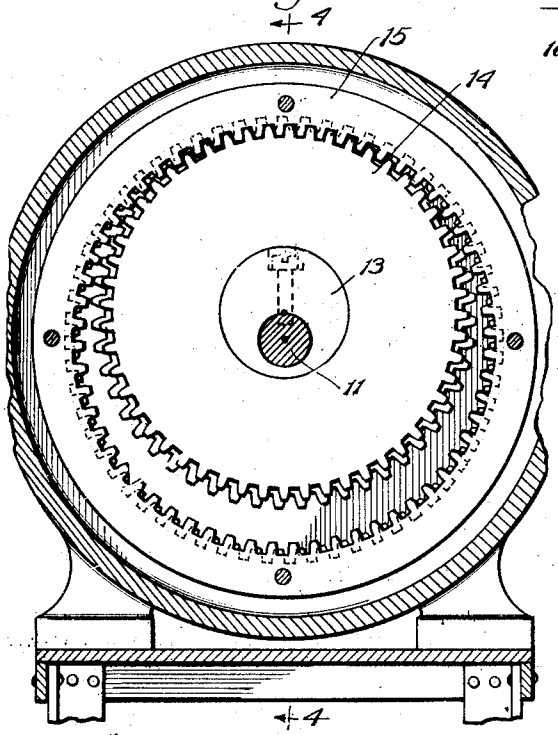
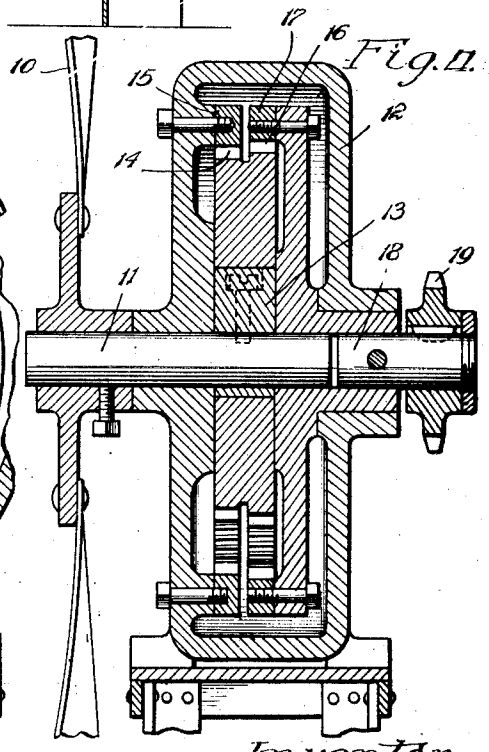


Fig. 4.



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UNITED STATES PATENT OFFICE.

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AIR-FILTER DRIVE.

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This invention relates to improvements in air filters and more particularly to improvements in means for driving the same.

Heretofore, air filters have been driven at fixed rates by constant speed motors, regardless of the use of the filter, which is represented approximately by the amount of air drawn through. Since the filter screens, especially the viscous coated metal screens, are most efficient after becoming partially coated with dust, or having been in the air stream for some time, it is obviously very desirable to provide a drive which varies directly with the amount of air passed through the filter. Accordingly, one of the main objects of this invention is to drive the filter proportionately to the quantity of air in order to obtain the highest efficiency from the filter, since the condition of the air being used is ordinarily nearly uniform and the quantity of the air may fairly be taken as a measure for the usage of the filter. This object is accomplished by driving the screen directly by the air, a fan being mounted in the air stream and geared directly to the screen.

Other objects and advantages are that no additional power is required, the driving mechanism is greatly simplified, and the movement of the screen is started and stopped automatically with the movement of the air stream.

An illustrative embodiment of this invention is shown in the accompanying drawings, wherein:—

Figure 1 is an elevation of an air washing unit.

Fig. 2 is an enlarged cross section of a portion of the unit shown in Figure 1.

Fig. 3 is a section through the reduction gear box, and is taken on the line 3—3 of Fig. 2.

Fig. 4 is a longitudinal cross section of the gear box, taken on the line 4—4 of Fig. 3.

Referring to the drawings, the cylindrical screen or filter drum 1 is rotatably mounted in the horizontal position in the frame 2. The outer end of the drum 1 is enclosed, and the inner end opens into the housing 3, as shown more clearly in Fig. 2. The housing 3 is connected into the intake opening of the blower 4 which is driven by the motor 5 and draws air in through the walls of the filter drum 1 and discharges the same through the outlet opening 6.

The inner end of the drum 1 is provided with an externally toothed ring 7, with which is meshed a pinion 8 secured on the drive shaft 9. The drive shaft 9 is rotatably mounted in suitable bearings fixed to the frame 2 and extends into the housing 3, as shown in broken lines in Fig. 1. A fragment of the inner end of the shaft 9 is shown in full lines in Fig. 2.

A large fan 10 is positioned in and substantially fills the opening through which the air flows from the drum into the housing 3. The fan 10 is fixed on the outer end of the short drive shaft 11 which is rotatably mounted in the gear reduction housing 12. An eccentric disc 13 is secured to the shaft 11 within the housing, and turns within and supports the drive gear 14 which meshes with the fixed internal gear 15, attached to the housing 12. This arrangement causes a partial rotation of the gear 14 at each revolution of the drive shaft 11. A slightly larger intermediate gear 16 is fixed to the drive gear 14, and meshes with the internal gear 17 which is rotatably mounted in the housing 12 and carries the driven shaft 18, fixed thereto.

The sprocket 19 is keyed on the outer end of the shaft 18 and is connected by means of a chain 20 to the inner end of the drum drive shaft 9. In this manner, a very great reduction in speed is obtained between the fan and the drive shaft 9, and a very small amount of power for driving the fan is sufficient to slowly revolve the filter drum 1.

A stationary oil distributor pipe 21 is mounted to extend across the lower side of the drum and is supplied with oil from the motor driven oil pump 22, to clean and wash the dust out of the screen as the drum is slowly rotated.

It is now manifest that the rotation of the drum, and consequently the amount of washing the screen, is very closely in proportion to the amount of air drawn through the filter, since substantially all of the air is constrained to pass through the fan, and causes the fan to turn approximately in a direct ratio to the velocity of the air stream.

The power for the operation is, of course, supplied by the motor 5, but the additional load on the blower is negligible, also the fan starts and stops with the blower and requires no special attention.

Although but one specific embodiment of

this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. In an air filter, a filter screen, an oil dispenser related with said screen, and means for causing relative movement between said screen and said dispenser, said means driven by the air flowing through the screen.

2. In an air filter, a filter screen, an oil dispenser related with said screen, and a fan driven by the air flowing through the screen, said fan connected for causing relative movement between said screen and said dispenser.

3. In an air filter, a movable filter screen, a fan mounted in the path of the air flowing through said screen, said fan positively connected for moving said screen.

4. In an air filter, a filter screen, an oil dispenser related with the screen, means for passing currents of air through said screen, and means positively operated by said air currents for causing relative movement between said screen and said dispenser.

Signed at Chicago this 16th day of August, 1926.

JOHN E. BOLLING.