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CLEANING TOOL FOR FILTERS

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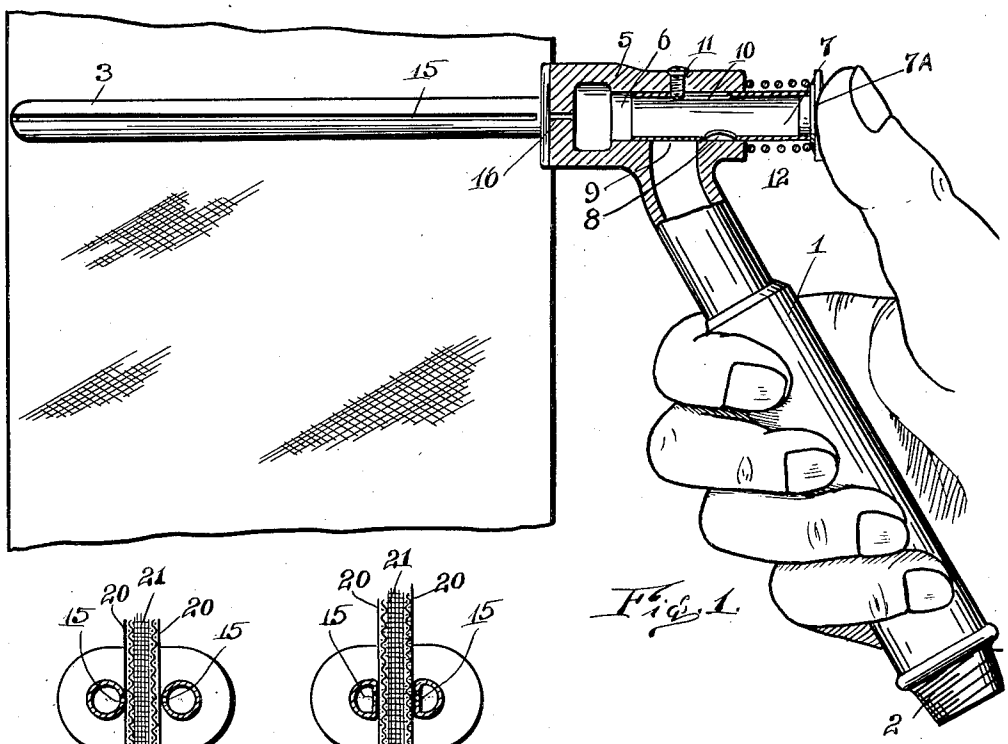


Fig. 1.

Fig. 3.

Fig. 4.

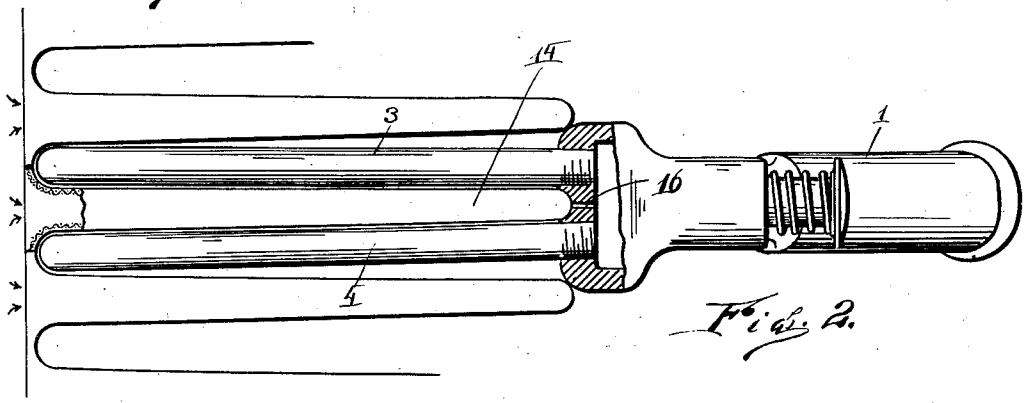


Fig. 2.

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UNITED STATES PATENT OFFICE

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CLEANING TOOL FOR FILTERS

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This invention relates to cleaning tools for cleaning filters and has for one of its objects, to provide means whereby a cleaning fluid may be passed through a reduced area of the filtering material in the reverse direction from the flow of the fluid that is being cleaned by the filter.

Another object of this invention is to provide a tool by means of which the whole of the filtering surface or a portion of it is cleaned by directing the cleaning fluid through consecutive and continuous sections of the whole of the filtering surface on the movement of the tool in one direction.

Another object of this invention is to provide means whereby the cleaning fluid can be passed through the filtering material at a higher pressure or greater velocity than the pressure and velocity under which the fluid to be cleaned is passed therethrough.

These and other objects of this invention will be fully illustrated in the drawings, described in the specification, and pointed out in the claims at the end thereof.

In the accompanying drawings:

Figure 1 is a side elevation and partial section of the cleaning tool.

Figure 2 is a top plan view and partial section of the cleaning tool.

Figure 3 is a vertical sectional view of the nozzles of the cleaning tool.

Figure 4 is a similar sectional view of a slightly modified form of the nozzles of the cleaning tool.

In the several figures of the drawings like reference numerals indicate like parts.

The cleaning tool forming the subject matter of this invention is especially adapted for use with air filters of the type illustrated in my prior application Serial No. 280.992 filed May 28, 1928. The tool is so constructed that such a filter may be easily and quickly cleaned by the use of it.

In the drawings reference numeral 1 indicates the hollow handle of the tool, the lower end of which is provided with suitable connecting means such as a thread 2 whereby a flexible hose (not shown) may be attached to the handle. The handle 1 is of suitable diameter and extends angularly to the nozzles 3 and 4 of the tool so that the tool can be readily held in position and handled by the hand in cleaning the filter as illustrated in Figure 1. The upper end of the handle 1 terminates into the combined manifold and valve casing 5 where the flow of the cleaning medium is controlled and distributed into the nozzles 3 and 4.

The valve casing comprises a horizontal cylindrical duct in which the valve sleeve 7 is mounted to slide. This valve sleeve is open at the inner end but is closed at the outer end by means of the thumb piece 7A. In the wall of the sleeve is provided the opening 8. This opening is normally held out of register with the opening 9 in the upper end of the hollow handle so that the flow of air or other cleaning medium is shut off at this point. The sleeve is also provided with a guide slot and a stop pin or set screw 11 provided in the casing 5 projects into this guide slot and limits the movement of the valve sleeve to the length of this guide slot. The guide slot is just long enough to allow a movement of the sleeve that will bring the hole 8 either into or out of register with the opening 9 in the upper end of the handle 1.

Normally the openings are out of register and are held in this position by the expansion spring 12 that surrounds the outer end of the sleeve 7 and is interposed between the rear of the valve casing and the flange formed by the thumb piece 7A.

The nozzles 3 and 4 project from the manifold and are suitably fastened therein. Each nozzle consists of a tubular member that is open at the inner end and closed at the outer end. The nozzles are suitably spaced from each other and project from the manifold so that each nozzle is held parallel to and in close proximity with the outer surface of one of the filtering pockets 14 as illustrated in Figure 2. In the case illustrated in Figure 2 the filtering pockets are slightly wedge shaped and the nozzles 3 and 4 therefor project at a slight angle from the manifold in order to keep the nozzles in contact with the filtering surface the full depth of the pocket that they straddled.

Each of the nozzles is provided with a slit

15 which is located on the inside of each nozzle so that the slits of the nozzles are directly opposite each other. Air under pressure is preferably used for cleaning the filters by means of this cleaning tool and the compressed air is forced through the filtering surface in the reverse direction from the flow of the air that is being filtered by the filter. Thus the air to be filtered enters the filtering pockets in the direction indicated by the arrows in Figure 2 while the compressed air from the nozzles of the cleaning tool is forced against the outer surface of the pockets and thru the filtering material in the opposite direction so that any foreign matter adhering to the inside of the pockets is blown off by the air from the cleaning tool.

The foreign matter thus blown off the inside surface of the pockets is at the same time blown out of the pocket by the air that is forced through the end of the pocket from the opening 16. This opening is provided in the manifold at a point intermediate of the nozzles 3 and 4 and forms a third nozzle. The air that issues from this third nozzle blows through the filtering material at the end of the pockets and at right angles to the air blown through the filtering material at the sides of the filtering pockets. Any foreign matter blown off the sides of the filtering pockets by nozzles 3 and 4 is thus at the same time blown out of the open end or intake of the pocket, by the nozzle 16. This prevents the foreign matter from settling in the bottom of the pockets after it has been blown off the filtering surface by the nozzles 3 and 4.

The nozzles illustrated in Figure 4 have a flat surface on the opposing sides of the nozzles and the slit through which the air issues from these nozzles is located in the middle of this flat surface. The flat surface on each side of the slit is desirable because in holding the flat surface against the filtering surface it prevents the air issuing from the slit from blowing up or down the outside of the filtering surface, so that all of the air issuing from the nozzle is forced through the filtering surface at right angles thereto and efficiently blows off the foreign matter on the inside of the filtering pocket.

As illustrated in Figure 1 the tool is used by first inserting the nozzles between two consecutive filtering pockets so that the pair of nozzles and the manifold which connects them straddles one complete pocket. The valve sleeve 7 is then forced into the casing 5 by means of the thumb of the hand to allow the air to pass from the handle into the manifold and out through the nozzles as above pointed out. With the air issuing from the nozzle the tool is then moved up or down the leng.h of the pocket. This is repeated for each pocket until the whole of the filter is clean.

As illustrated in section in Figures 3 and 4 the filtering surface 20 of the filter which preferably consists of a filtering cloth such as felt etc., is supported on a rigid frame formed of a metal screen 21 and bent into the shape of the pockets illustrated in Figure 2. This frame serves two purposes in that it not only supports the filtering material and holds it in its proper shape but also guides the cleaning tool as it is being moved over the filtering surface of one of the pockets. The nozzles 3 and 4 straddle the frame of the filtering pocket and are thus guided over the filtering surface and held in contact with it on the movement of the tool from one end of the pocket to the other.

I claim:

1. A cleaning tool for filters comprising a manifold, a pair of nozzles projecting from said manifold and adapted to engage the outside of opposing filtering surfaces, each of said nozzles having a slit therein, said slits being located opposite each other to direct the flow of the cleaning fluid from the nozzles thru the filtering surfaces at right angles thereto and toward each other, a third nozzle in said manifold located intermediate of said pair of nozzles to direct a portion of the cleaning fluid parallel to the filtering surface along the inside thereof and at right angles to the flow of the cleaning fluid issuing from said pair of nozzles.

2. A hand tool for cleaning filters comprising a manifold, nozzles projecting therefrom, a hollow handle depending from said manifold, said hollow handle having an opening connecting the inside of said handle with the inside of said manifold, a valve sleeve having an opening in the wall thereof mounted to slide in said manifold over the opening leading from said hollow handle, and means for bringing the opening in said valve sleeve into and out of register with the opening leading from said hollow handle.

3. A hand tool for cleaning filters comprising a manifold, a pair of nozzles projecting from said manifold, each of said nozzles having a flat face the flat face of one of said nozzles opposing the flat face of the other, each of said flat faces of said nozzles having a slit therein, said nozzles being adapted to straddle the filter to direct the cleaning fluid through the filtering surface at right angles thereto.

In testimony whereof I affix my signature.

LEWIS L. DOLLINGER.