Nov. 3, 1931. L. L. DOLLINGER 1,830,096

PANEL AIR FILTER

Filed May 28, 1928 2 Sheets-Sheet 1

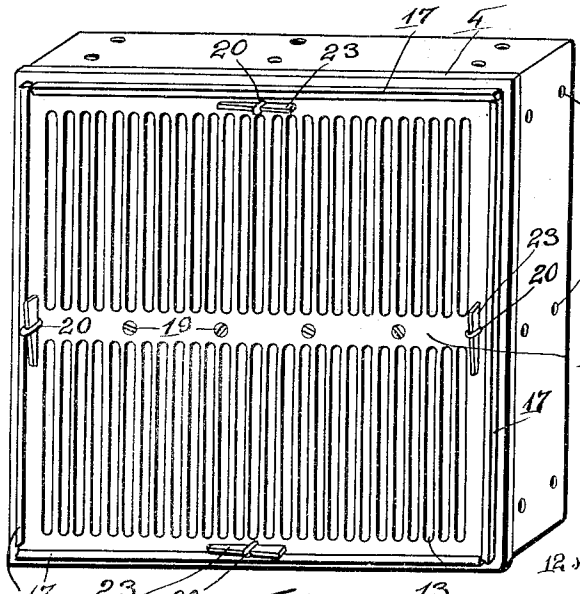


Fig. 1.

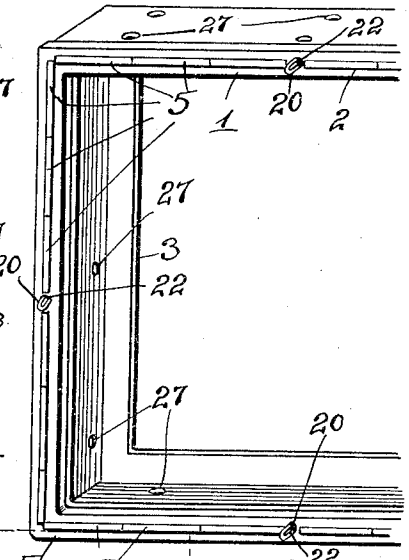


Fig. 2.

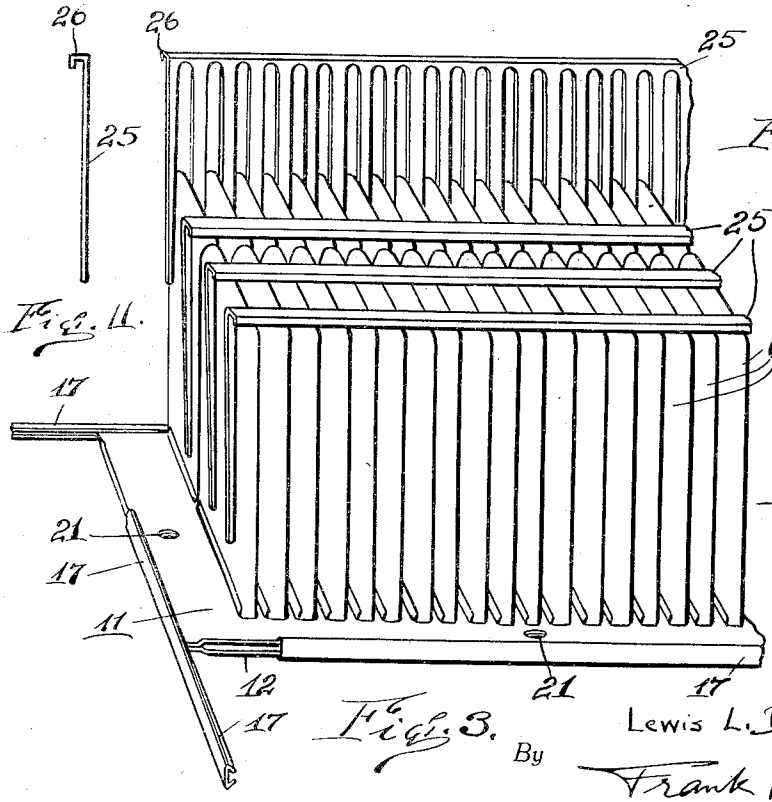


Fig. 3.

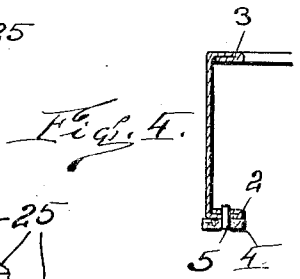


Fig. 4.

Fig. 11.

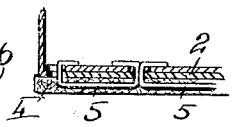


Fig. 12.

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Attorney

Nov. 3, 1931. L. L. DOLLINGER 1,830,096

PANEL AIR FILTER

Filed May 28, 1928 2 Sheets-Sheet 2

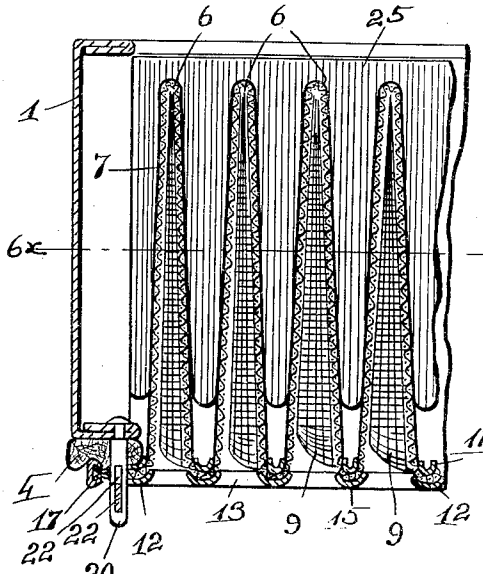


Fig. 5.

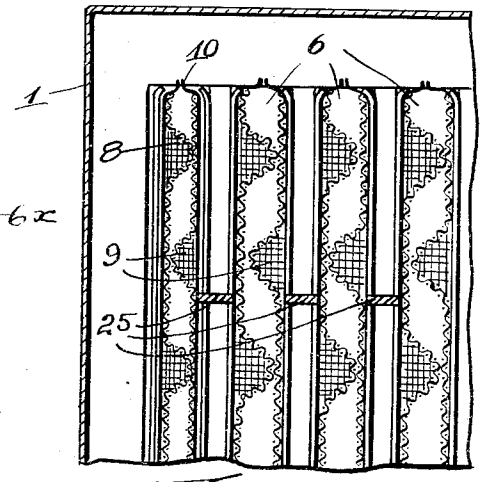


Fig. 6.

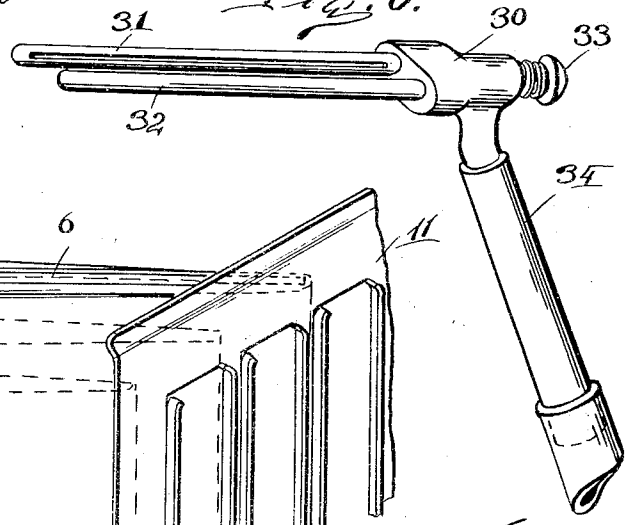


Fig. 8.



Fig. 10.

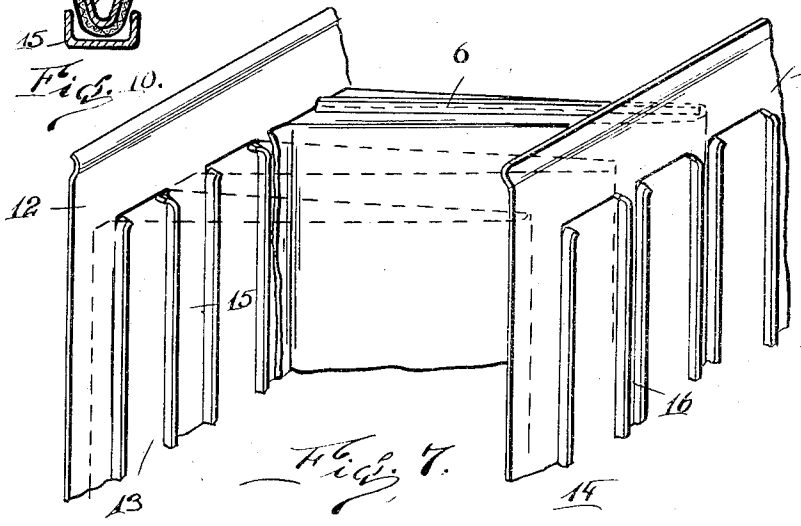


Fig. 7.

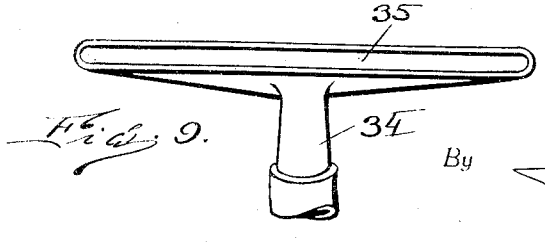


Fig. 9.

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Patented Nov. 3, 1931 1,830,096

UNITED STATES PATENT OFFICE

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PANEL AIR FILTER

Application filed May 28, 1928. Serial No. 280,992.

The object of this invention is to provide a new and improved air filter of large capacity and compact size in units which can be used separately or two or more of which can be joined together in a filter of larger size.

Another object of the invention is to provide for economical manufacturing and assembling of the filter and economical replacement of parts.

Another object of the invention is to make the filter strong structurally and yet of light weight with large capacity and minimum space.

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

In the drawings:

Figure 1 is a perspective view of the filter unit assembled complete.

Figure 2 is a perspective view of a portion of the metal casing of the filter.

Figure 3 is a rear perspective view of a set of the filtering pockets, and the combs for separating and spacing the pockets apart.

Figure 4 is a horizontal section through the casing on the line $4x$, $4x$ of Figure 2.

Figure 5 is a horizontal section through a portion of the filter and its casing, the section being taken on the line $5x$, $5x$ of Figure 1.

Figure 6 is a section on the line $6x$, $6x$ of Figure 5.

Figure 7 is a perspective view of the two plates between which the open ends of the filter are clamped, the plates being shown drawn apart but in position ready to be brought together.

Figure 8 is a perspective view of a special forked tool for cleaning the pockets of the filter from behind one at a time.

Figure 9 is a perspective view of a tool for cleaning the pockets of the filter from in front.

Figure 10 is an enlarged sectional elevation of the joint between the ribs 15 and 16 and the wire screen and cloth of the filter.

Figure 11 is an end elevation of the comb.

Figure 12 is an enlarged sectional view along the line $12x$, $12x$ of Figure 2.

In the drawings like reference numerals indicate like parts.

In the drawings reference numeral 1 indicates a metal casing for a filtering unit which casing is square or rectangular in shape and has the inwardly turned flanges 2 and 3 around the front and back end thereof. On the flange of the forward end of the filter a felt washer 4 is provided which extends clear around the four sides of the casing covering the flange 2. The flange 2 is slotted at frequent intervals and straps 5, 5 are imbedded in the face of the washer along the middle of it and are used to bind the felt washer in place, each strap passing through the felt washer and two of the slots. The strap is bent up under the flange so as to hold the strap securely in place and thereby hold the washer in place.

The filtering pockets 6, 6 are formed of a single web of wire screen bent to a serpentine form shown in Figure 5, as many pockets being formed from a single web of wire as it is desired to have in the filter, on one side thereof. These pockets are covered with a filtering cloth 7, 7 which is also made into pockets the pockets formed of the wire screen serving to hold themselves open and also serving to hold open the pockets made of the cloth. The wire pockets are indented from opposite sides, the indentations extending from top to bottom as shown at 8 and 9 and these indentations are staggered. These indentations serve to hold the flat intermediate portions of the wire screen apart so as to provide ample air passages through each pocket formed of the wire screen so as to permit the free passage of air therethru. The cloth or felt pockets that are placed over the wire pockets have their edges sewed together as shown at 10 so as to close the pockets on the ends to prevent the possibility of air passing through so that the air can pass through only in the regular way so that it will be filtered thereby.

Two series of pockets such as are shown in Figures 5 and 6 are assembled with two plates 11 and 12. These plates are perforated with slots 13 and 14 which perforations are separated by channel shaped ribs or bars

15 and 16. In assembling the pockets the wire screen and the felt cloth cover are placed on the plate 12 with the openings of the pockets opposite the openings 13 and the edges of the openings of the screen pockets resting on the ribs 15. The plate 11 is then placed over the other or closed ends of the pockets with the rib 16 between the pockets and this plate 11 is then brought down on the plate 12 so that between the two plates the upper ends of the wire screen and the cloth felt pockets are firmly held together at the open ends of the pockets. The rim of the plate is shown at the lower left hand corner of Figure 5. The rim of each of the plates is bent first toward the other plate and then away from the other plate so as to form a V shaped rim on the edge of the two plates. A channel shaped lock bar 17 is then slipped over the edges of the two plates firmly locking the two plates together on that edge. One of these lock bars is used on each of the four edges of the two plates so that four lock bars firmly lock the two plates 11 and 12 together.

The slots 13 and 14 in the plates do not extend clear across the plates but are interrupted in the middle of each plate by the web 18. These webs in the two plates are joined together by screws 19 so that the two plates are thus fastened together all around the rim thereof and down the middle line thereof. Thus two rows of slots are shown in Figure 1 and the ribs between the slots of one row support one row of pockets and the ribs between the slots of the other pocket support the other row of pockets. With the two plates and the two rows of pockets thus brought together, the plates and pockets are assembled with the casing 1.

To join the casing with the plates I provide studs 20 one on each of the four sides of the casing each stud being located in the middle of the side. Each stud is riveted in the casing of the frame at one end. The other end passes through an opening 21 in the plates 11 and 12. Each of the studs is slotted as indicated at 22 and a key 23 is passed through the slot and this forces the plates 11 and 12 down on the felt washer 4 and firmly locks the plates to the casing with an air tight joint.

On the back of the pockets I provide the metal combs 25, 25 each of which combs has a series of teeth, the teeth being adapted to enter between the consecutive pockets to firmly space them apart and hold them fixed in position, the teeth of the combs are slightly tapered and the back of each comb is made channel shape as indicated at 26 for the purpose of stiffening and strengthening it.

Two of these filtering units can be put side by side in a larger frame and coupled up to a single exhaust pipe and four of them can be assembled in a square frame and coupled up to a still larger exhaust pipe. To facilitate joining these units together all four sides of the frame 1 are perforated with holes as indicated at 27, 27 through which bolts can pass for the purpose of joining any two frames together, end to end or side by side as may be desired. In this way a filter may be assembled of any size that may be desired for the units are thus interchangeable for coupling together. The packing strips 4 make close contact with each other and make air tight joints between adjacent units.

For the purpose of cleaning the pockets from the side shown in Figure 3 I remove the combs 25 and use the tool 30 shown in Figure 8. This tool is provided with a hollow base in which two tubes 31 and 32 are joined each of which tubes has a slot along the inner edge thereof placed so that the slots occur opposite each other. These tubes are placed so as to straddle the cloth of a single pocket and the tool is drawn along the pocket.

Air is forced into the tool under pressure through the handle 34 and out through the tubes 31 and 32. In the base is provided a valve 33 which valve can be pressed to open the blast to the tubes 31 and 32 to cause the air to be forced through them. When this valve is open and the tool is drawn along the pocket the blast of air through the filter cloth blows the dust out of the pocket and cleans it.

In Figure 9 I have shown a handle 34 with a wide nozzle 35 for the purpose of cleaning the pockets from the front or on the side shown in Figure 1. This nozzle works by suction.

It will be understood that in the regular operation of this filter the air being cleaned passes thru the pockets from the front of the filter as shown in Figure 1. The combs 25 serve the purpose of holding the pockets in shape and equally spaced while the air is being drawn thru the filter for the purpose of cleaning the air. The indentations or stiffening ribs 8 and 9 are needed when the tool shown in Figure 9 is drawn across the slots or pockets shown in Figure 1 making connection with the pockets one at a time.

It will also be understood that the plates 11 and 12 make joints with the pockets that are substantially air tight so that when the cleaning tool 35 is drawn over the plate 12 the air that is sucked by the tool must come thru the pocket in the reverse direction and cannot leak at the joints between the pockets. This makes it possible to use a small suction machine with good effect for it operates on one pocket at a time and the full force is concentrated on that pocket which it cleans almost instantaneously.

I claim:

1. A filter having a pocket formed of wire netting bent to suitable shape, ribs formed in the netting in each side of the pocket extending up and down thereon, the ribs on one

side alternating with the ribs on the other side of the pocket, said ribs serving to hold the pocket open and form air passages therein.

2. A filter having a pocket formed of wire netting bent to suitable shape, ribs formed in the netting in each side of the pocket extending up and down thereon, the ribs on one side alternating with the ribs on the other side of the pocket, said ribs serving to hold the pocket open and form air passages therein, a pocket of filtering cloth placed over each pocket formed of wire netting and adapted to operate in connection therewith.

3. A filter having a pocket formed of wire netting bent to suitable shape, ribs formed in the netting in each side of the pocket extending up and down thereon, the ribs on one side alternating with the ribs on the other side of the pocket, said ribs serving to hold the pocket open and form air passages therein, said pockets being arranged side by side in a row, a comb having teeth adapted to engage with said pockets to separate them from each other.

4. A filter having a series of pockets formed of a web of wire netting bent to suitable shape, a plate having a series of parallel bars therein with slots between them adapted to be placed over the pockets from the under side thereof with the bars between the pockets, a similar plate having a series of parallel bars therein with slots between them adapted to be placed in the pockets from above, means for clamping said plates together with the bars of one plate over the bars of the other plate with the long sides of the rims of the pockets between the bars.

5. A filter having a series of pockets formed as a unit from a continuous strip of wire screen, a filtering medium covering said screen, two plates perforated with slots to form a grid of parallel bars therein, one of said plates being adapted to be placed over the pockets from the under side thereof with the bars between the pockets to space said plates, the other plate being adapted to be placed over the pockets from above, means to clamp said plates together with the bars of one of said plates over the bars of the other plate with the long side of the rims of the pockets between the bars.

6. A filter having a series of pockets formed as a unit from a continuous strip of wire screen, a filtering medium covering said screen, two plates perforated with slots to form a grid of parallel bars therein, one of said plates being adapted to be placed over the pockets from the under side thereof with the bars between the pockets to space said plates, the other plate being adapted to be placed over the pockets from above, lock bars engaging the edges of said plates to clamp said plates together with the bars of one of said plates over the bars of the other plate with the long side of the rims of the pockets between the bars.

7. A filter having a series of pockets formed as a unit from a continuous strip of wire screen, a filtering medium covering said screen, two plates perforated with slots to form a grid of parallel bars therein, one of said plates being adapted to be placed over the pockets from the under side thereof with the bars between the pockets to space said plates, the other plate being adapted to be placed over the pockets from above, means to clamp said plate together with the bars of one of said plates over the bars of the other plate with the long side of the rims of the pockets between the bars, a metal casing having an inwardly turned flange around the front thereof, said plates being adapted to fit on said casing with the edges of the plates resting on the flange, a washer interposed between the plates and the flange making an air tight joint between them and means for fastening the plates and washer to the flange.

8. A filter having a series of pockets formed as a unit, from a continuous strip of wire screen, a filtering medium covering said screen, two plates perforated with slots to form a grid of parallel bars therein, one of said plates being adapted to be placed over the pockets from the under side thereof with the bars between the pockets to space said plates, the other plate being adapted to be placed over the pockets from above, means to clamp said plates together with the bars of one of said plates over the bars of the other plate with the long side of the rims of the pockets between the bars, a metal casing having an inwardly turned flange around the front thereof, said plates being adapted to fit on said casing with the edges of the plates resting on the flange, a washer interposed between the plates and the flange making an air tight joint between them, studs on the flange of said casing, said plates being perforated to receive said studs, said studs having slots therein, and wedges passing thru said slots to clamp the plates to the casing.

9. A filter having a series of pockets formed of a web of wire netting bent to suitable shape, a plate having a series of parallel channels therein with slots between them adapted to be placed over the pockets from the under side thereof with the channels between the pockets, a similar plate having a series of parallel channels therein with slots between them adapted to be placed in the pockets from above, means for clamping said plates together with the channels of one plate over the channels of the other plate with the long sides of the rims of the pockets between the channels.

10. In a filter, the combination of a series of filter pockets arranged in a row, and bent up from a continuous strip of wire screen, a filtering medium covering said filtering

screen, a pair of plates having ribs therein with slots between them, means for fastening the filtering material between the pockets between said ribs so as to make the ribs a part of the pockets and provide a smooth face plate for the filter.

11. In a filter, the combination of a series of filter pockets arranged in a row, and bent up from a continuous strip of wire screen, a filtering medium covering said filtering screen, said pockets being tapered from the open end to the bottom thereof to equalize the flow of air therein, a pair of plates having ribs therein with slots between them as wide as the open end of the pockets, means to fasten the filtering material surrounding the pockets between said ribs so as to make the ribs a part of the pockets and provide a smooth face plate for the filter.

12. In a filter, the combination of a casing having a flange having slots therein transversely thereof, a washer on said flange, straps passing thru said flange and said washer and over the washer and embedded in the face of said washer along the middle of it to bind the washer in place on the flange.

13. A filter having a series of pockets formed as a unit from a continuous wire screen, a filtering medium covering said screen, two plates perforated with slots to form a grid of parallel bars therein, one of said plates being adapted to be placed over the pockets from the under side thereof, with the bars between the pockets the other plate being adapted to be placed over the pocket from above, means for clamping said plates together with the bars of one of said plates over the bars of the other plate with the long side of the rims of the pockets between the bars, a metal casing having an inwardly turned flange around the front thereof, said plates being adapted to fit on said casing with the edges of the plates resting on the flange, a washer interposed between the plates and flange to form an air tight joint between them, studs on the flange one on each side of the casing, said plates being perforated to receive said studs, said studs having slots therein, wedges passing through said slots to clamp the plates to the casing.

In testimony whereof I affix my signature.

LEWIS L. DOLLINGER.