June 24, 1941. E. G. ZIEMANN 2,247,326

AIR FILTER

Filed July 26, 1940 2 Sheets-Sheet 1

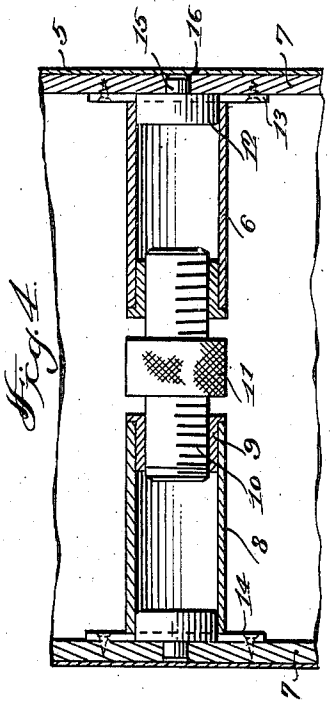


Fig. 4.

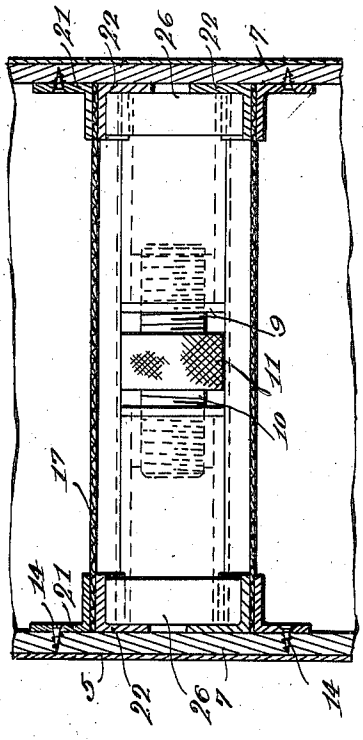


Fig. 5.

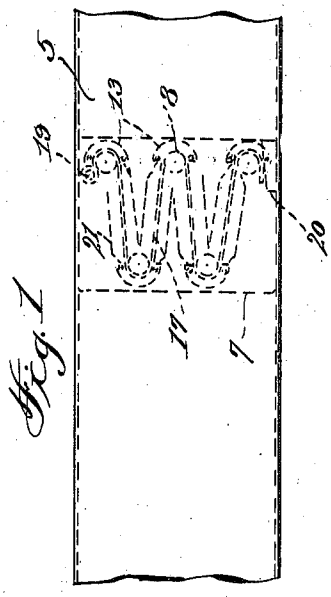


Fig. 1.

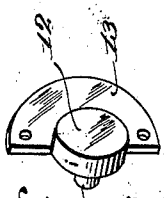


Fig. 6.

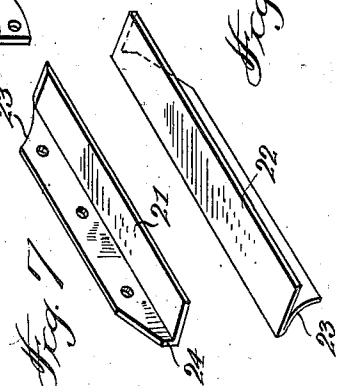


Fig. 7.

Fig. 8.

Inventor

Emil George Ziemann

By Ralph G. Burch

Attorney

June 24, 1941. E. G. ZIEMANN 2,247,326

AIR FILTER

Filed July 26, 1940 2 Sheets-Sheet 2

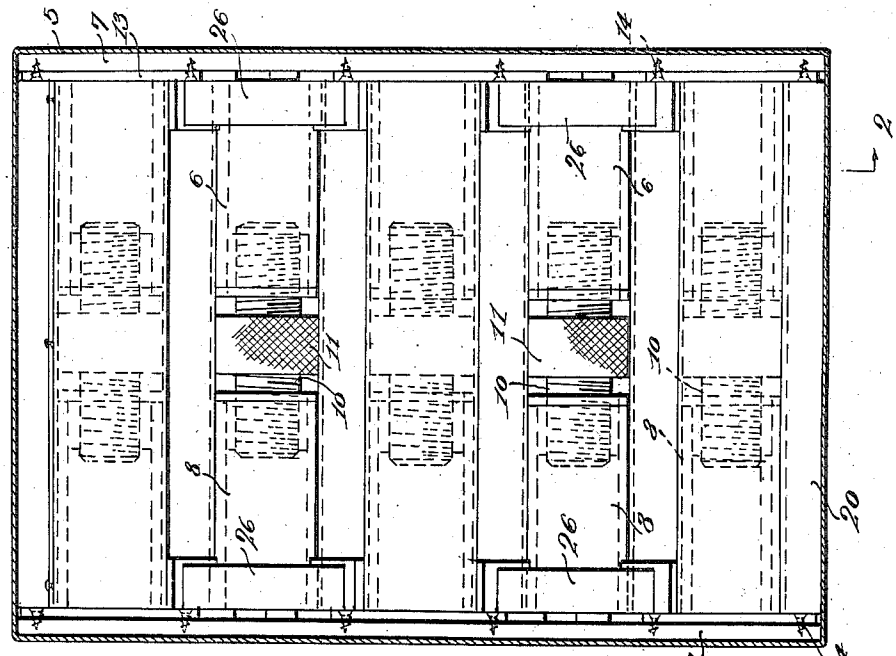


Fig. 3.

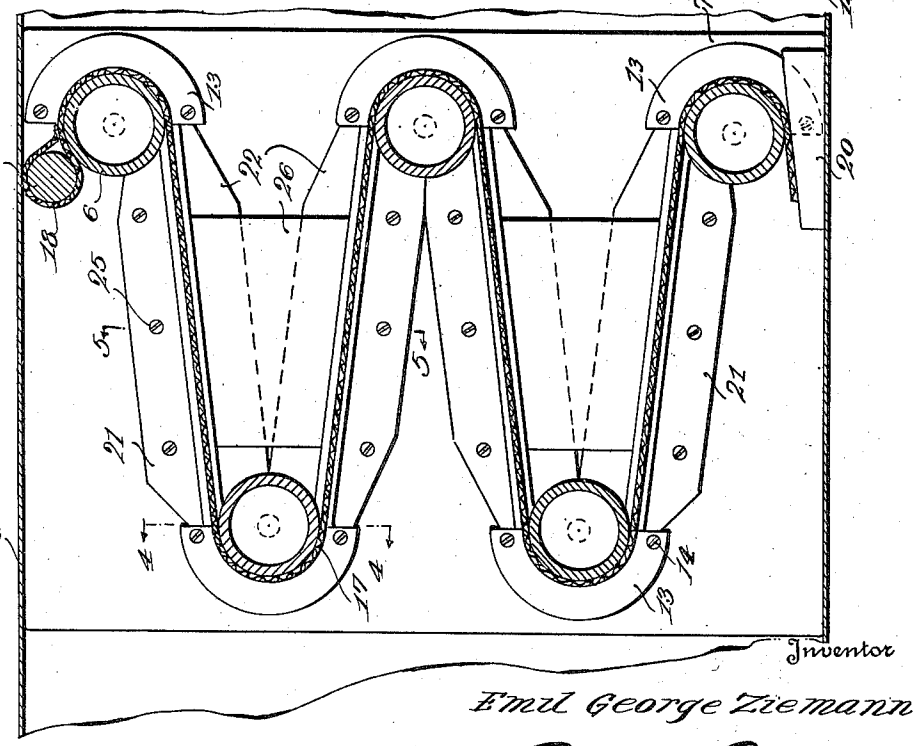


Fig. 2.

Inventor

Emil George Ziemann

By Ralph B Burch

Attorney

Patented June 24, 1941

2,247,326

UNITED STATES PATENT OFFICE

2,247,326

AIR FILTER

Emil George Ziemann, Washington, D. C.

Application July 26, 1940, Serial No. 347,747

9 Claims. (Cl. 183—71)

This invention relates to an improved air filter particularly designed for air-conditioning systems.

It is an object of the invention to provide an air filter for mounting in the air duct of air-conditioning systems having a cloth filter extending in a zigzag course from the top to the bottom of the duct whereby a greater area of cloth is provided for filtering the air passing through the air duct.

A further object of the invention resides in mounting the filtering cloth in the air duct so that all edges of the cloth are thoroughly sealed to prevent any air continuing dust particles from passing around the filter cloth, thus insuring a thorough cleaning of the air passing through the air duct.

A still further object of the invention resides in providing an air filter which may be readily installed in a conventional air duct and thoroughly and quickly cleaned without removing the filter from the duct.

Another object of the invention resides in providing a device of the above-mentioned character which is simple and durable in construction, reliable and efficient in use, and inexpensive to manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same—

Fig. 1 is a side elevation of an air duct with the improved air filter installed therein, shown in dotted lines,

Fig. 2 is an enlarged longitudinal sectional view taken on line 2—2 of Fig. 3,

Fig. 3 is a front elevation of the air filter,

Fig. 4 is a detail section of one of the supporting rods taken on line 4—4 of Fig. 2,

Fig. 5 is a detail section taken on line 5—5 of Fig. 2,

Fig. 6 is a perspective view of one of the supports for the supporting bars,

Fig. 7 is a perspective view of one of the fixed angle bars for sealing the edge of the filtering cloth, and

Fig. 8 is a perspective view of one of the removable angle bars which co-act with the fixed angle bars to seal the edges of the cloth.

In the drawings, wherein for the purpose of illustration I have shown a preferred embodiment of my invention, the numeral 5 denotes generally the air conduit of a conventional air-conditioning system which may vary in size depending on the volume of air to be passed therethrough.

Referring more particularly to my invention, a series of horizontal supporting rods 6 are mounted between a pair of side boards 7 which are substantially square and of a height corresponding to that of the side walls of the air conduit in which they are to be installed. The supporting rods as more clearly shown in Fig. 4 include a pair of tubular end sections 8 of cylindrical shape having screw-threaded bushings 9 mounted in their inner ends to receive the respective right-hand and left-hand threaded ends of a bolt 10 which adjustably connects the tubular end sections together. A square portion 11 is formed in the center of the bolt to receive a wrench or other tool for turning the bolt to expand the end sections and thereby force the side boards 7 into tight sealing engagement with the walls of the conduit 5. The outer ends of the end sections 8 fit over circular bosses 12 having semi-circular flanges 13 which are fixedly secured to the side boards by screws 14. The bosses 12 are provided with central trunnions 15 on their outer faces which engage in openings 16 formed in the side boards.

As more clearly shown in Fig. 2, the series of supporting rods 6 are disposed in staggered relation from the top to the bottom of the side boards. A strip of suitable filter cloth 17 is passed around the supporting rods in a zigzag course, the cloth being of a width corresponding to the length of the rods. The upper end of the cloth is provided with a hem 18 adapted to receive a round rod 19 which is wedged between the top supporting rod and top wall of the conduit when the cloth is pulled taut, thus establishing a tight seal between the upper end of the cloth and top wall of the conduit. After the cloth is drawn taut the lower end is secured by a wedge block 20 which is inserted between the lowermost supporting rod and bottom wall of the conduit and thus establishes a tight seal between the lower end of the cloth and bottom of the conduit. The side edges of the filter cloth between the supporting rods are sealed between angle bars 21 and 22 having one flange abutting against the side boards and the other flange extending over the edge of the cloth. One end of the angle bars is curved, as at 23, to fit snugly against the supporting bars and their opposite ends have straight edges 24 to fit against the ends of the flanges 13 of the bosses 12. The angle bars on the inner side of the filter cloth are fixed to the side boards by screws 25

while the angle bars on the outer side are held in sealing relation to the fixed bars by wedge blocks 26 which engage between the lateral flanges of adjacent angle bars and permit the angle bars to be readily removed should it be found necessary to remove the filter cloth.

In use, the air filter may be readily assembled and installed in the conventional air duct of air-conditioning systems. It is disposed in the air duct with the side boards 7 parallel to the side walls of the duct, and upon turning the bolts 10 of the supporting rods 6 to expand the supporting rods the side boards are forced into tight sealing engagement with the side walls of the air duct. After passing the filter cloth 17 around the supporting rods in a zigzag course, the cloth is drawn taut to wedge the rod 19 at the upper end of the cloth between the uppermost supporting rod and bottom wall of the duct to secure the lower end of the cloth and establish an air-tight seal with the bottom wall of the duct. The removable angle bars are then inserted and forced into co-acting relation with the fixed angle bars to tightly seal the edges of the cloth between the supporting rods. Thus, it is seen that all edges of the cloth are tightly sealed so that the air passing through the air duct must pass through the filter cloth, insuring removal of all dust particles. The zigzag course of the filter cloth provides a large filtering area which greatly increases the efficiency of the filter.

To clean the filter, it is only necessary to insert a vacuum cleaner through an opening in the air duct and withdraw the dust particles from the surface of the filter cloth by suction.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same, and that certain changes in the shape, size, and arrangement of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. An air filter for mounting in a rectangular air duct, comprising a pair of side members, a series of extensible supporting rods mounted between said side members in staggered relation, said rods being adjustable longitudinally for expanding said side members into tight engagement with the walls of the air duct, and a filter cloth passing around said supporting rods in a zigzag course transversely of the air duct.

2. An air filter for mounting in a rectangular air duct comprising a pair of side members, a series of extensible supporting rods between said side members, means for adjusting said rods to expand said side members into tight engagement with the walls of the air duct, and a filter cloth passing over said supporting rods transversely of the duct.

3. An air filter for mounting in a rectangular air duct, comprising a pair of side members, a series of extensible supporting rods between said side members, means for adjusting said rods to expand said side members into tight engagement with the walls of the air duct, a filter cloth passing over said supporting rods transversely of the duct, sealing means at both ends of said cloth, and sealing means at the side edges of said cloth between said supporting rods.

4. An air filter for mounting in a rectangular air duct, comprising a pair of side members, a series of extensible supporting rods between said side members arranged in staggered relation, means for longitudinally adjusting said supporting rods to expand said side members into engagement with the walls of the air duct, and a filter cloth passing around said supporting rods in a zigzag course transversely of the air duct.

5. An air filter for mounting in a rectangular air duct, comprising a pair of side members, a series of supporting rods between said side members arranged in staggered relation, means for longitudinally adjusting said supporting rods, a filter cloth passing around said supporting rods in a zigzag course transversely of the air duct, a rod extending transversely of one end of said filter cloth adapted to be drawn into wedging engagement between the supporting rod adjacent the wall and the wall of the duct, and a wedge block adapted to be inserted between the supporting rod adjacent the opposite wall and the wall of the duct to secure and seal the other end of the filter cloth.

6. An air filter for mounting in a rectangular air duct, comprising a pair of side members, a series of adjustable supporting rods between said side members arranged in staggered relation, means for adjusting said supporting rods longitudinally to expand said side members into engagement with the side walls of the air duct, a filter cloth passing around said supporting rods in a zigzag course transversely of the air duct, a rod extending transversely of one end of said cloth adapted to be drawn into wedging engagement between the supporting rod adjacent the wall and the wall of the duct, a wedge block adapted to be inserted between the supporting rod adjacent the opposite wall and the wall of the duct to secure and seal the other end of said cloth, angle bars disposed on opposite sides of said cloth along the edges thereof between the supporting rods, the angle bars on one side of the cloth being removable, and means for holding and forcing said removable angle bars into sealing engagement with the edges of said cloth.

7. An air filter for mounting in a rectangular air duct comprising a pair of side members, supporting rods extending between said side members, one of said rods being positioned adjacent to one wall of the duct and another of said rods positioned adjacent to the opposite wall of the duct, a filter cloth extending between said supporting rods transversely of the duct, means at one end of said cloth for wedging the cloth between the rod adjacent one wall and the wall of the duct when said cloth is drawn taut, and means at the opposite end of said cloth adapted to be inserted between the rod adjacent the opposite wall and wall of the duct for wedging said cloth in sealing engagement with said rod and holding said cloth taut.

8. An air filter for mounting in a rectangular air duct comprising a pair of side members, supporting rods extending between said side members, one of said rods being positioned adjacent to one wall of the duct and another of said rods positioned adjacent to the opposite wall of the duct, a filter cloth extending between said supporting rods transversely of the duct, a rod extending transversely of one end of said cloth and adapted to be drawn into wedging engagement between a supporting rod adjacent the wall and the wall of the duct when said cloth is drawn taut, and a wedge block adapted to be inserted between the supporting rod adjacent the opposite wall and the wall of the duct to secure and hold the other end of the filter cloth.

9. An air filter for mounting in a rectangular

air duct comprising a pair of opposed side members, a series of extensible supporting rods between said side members arranged in staggered relation and adapted to expand said side members into engagement with the side walls of the air duct, each rod being composed of tubular sections connected by a right and left hand screw rod, trunnions projecting from said side members to receive the open ends of the tubular sections of said rods, and a filter cloth passing around said supporting rods in a zigzag course.

EMIL GEORGE ZIEMANN.