Sept. 16, 1958 H. F. FRUTH ET AL 2,852,092

FRAME FOR ELECTRIC PRECIPITATORS

Filed Oct. 17, 1955

Fig. 1

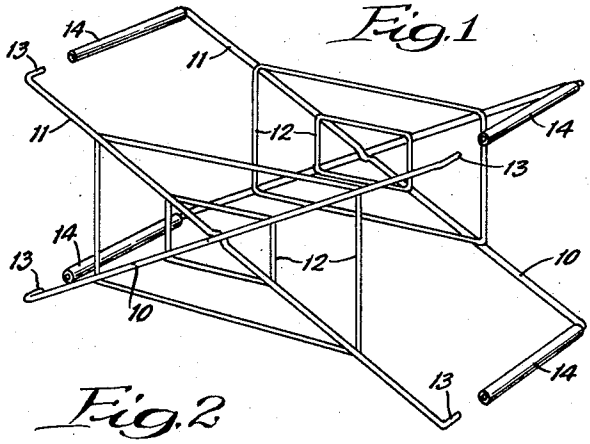


Fig. 2

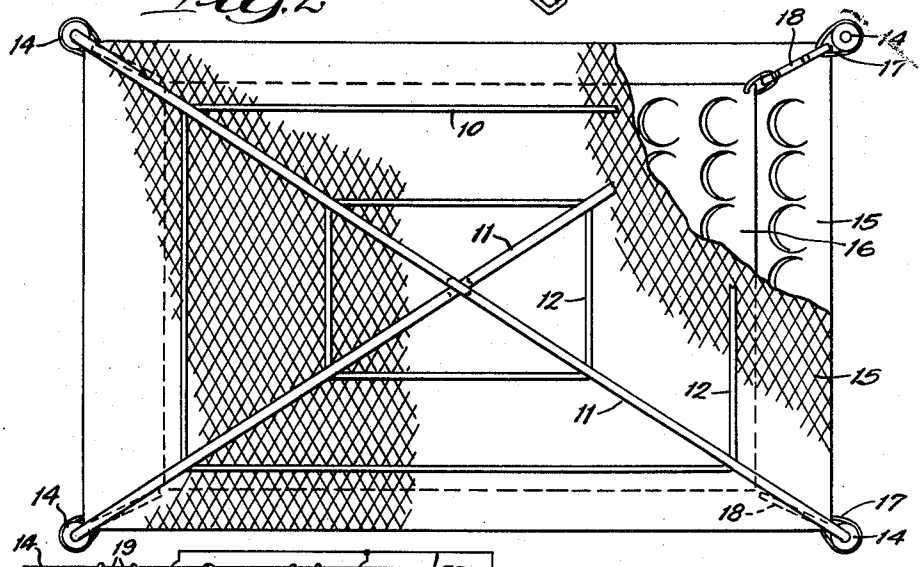


Fig. 3

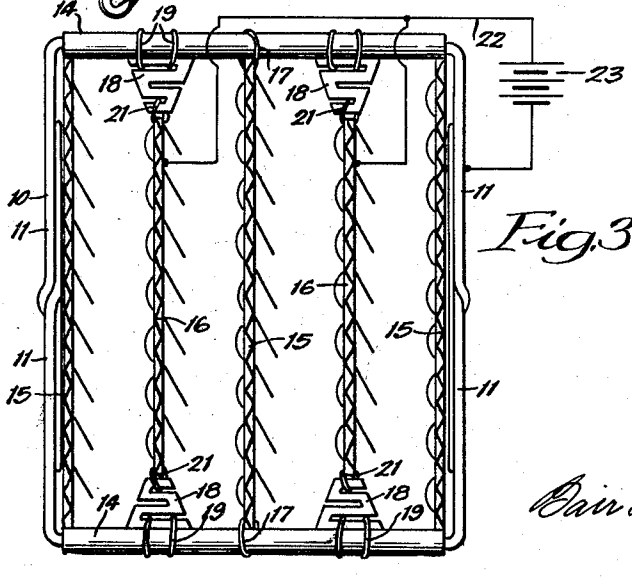
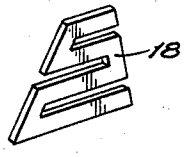


Fig. 4



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FRAME FOR ELECTRIC PRECIPITATORS

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4 Claims. (Cl. 183—7)

This invention relates to frames for electric precipitators and more particularly to a frame and mounting construction for supporting a plurality of conductive collector and ionizing plates.

The invention is primarily concerned with the type of electric precipitators in which two sets of spaced parallel collector plates are supported in alternating relationship in a chamber through which air or other gas to be cleaned passes. The invention has for one of its objects the provision of a frame which is simple and inexpensive to construct, which is easy to assemble and which effectively holds the plates in parallel spaced relationship to each other.

Another object is to provide a frame which is made up of two end members each formed of rods with their ends turned inwardly at right angles and secured together by slipping the ends of the rods into tubes or the like.

According to one feature of the invention, the end members are identical and are assembled in reversed relationship to minimize the number of different parts required. Such a frame is easy to assemble and is equally easy to disassemble for replacement of the collector plates. The tubes connecting the end members may be made of either conductive or non-conductive material as desired.

A further object is to provide a frame in which the collector plates are supported on cross rods or tubes around the periphery of the plates.

A still further object is to provide a frame for an electric precipitator in which one set of collector plates is secured directly to the cross rods or tubes in conductive relation thereto and the other set is secured to the cross rods or tubes by insulating fastenings to maintain the plates of the two sets electrically insulated from each other.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying drawing, in which:

Figure 1 is a perspective view of a frame embodying the invention partially disassembled;

Figure 2 is a side elevation with parts broken away showing the frame with collector plates assembled thereon;

Figure 3 is an end view of the assembly of Figure 2; and

Figure 4 is a perspective view of an insulating support used with the frame.

The frame of the present invention is adapted to support a plurality of electrically conductive collector plates in spaced parallel relation to each other within a suitable housing or casing through which air or other gas to be cleaned is circulated.

The frame may be supported in any desired manner in the housing or casing as, for example, merely by resting on the floor thereof, and will hold the plates properly positioned during operation.

The frame, as shown, comprises two identical end members each formed of rods or heavy wire, or the like. Each end member comprises two crossed rods **10** and **11** intersecting and secured together at their centers, the rods preferably being of equal length so that their ends lie at the corners of a rectangle. The rods may be braced for additional strength and rigidity by inner frame members **12** of rectangular shape abutting and secured to the rods by welding or the like to hold the rods in the desired angular relationship to each other. The ends of the rods are bent inward at right angles to form end projections **13** and the two frame members are assembled in reversed relationship to each other so that the end members **13** lie respectively in alignment with and facing each other.

The frame is completed by four corner rods or tubes **14** which have axial openings in their ends of a size snugly to receive the end members **13** of the rods. The rods or tubes **14** may be made of any desired length, depending upon the size of frame desired and may simply be slipped over the end projections **13** of the rods to secure the end members together in parallel spaced relationship in a sturdy, relatively rigid assembly. The cross members **14** are preferably formed of lengths of standard tubing which may be either metal tubing, where a conductive frame is desired, or may be formed of insulating material, such as ceramic material, where an insulated frame is desired.

Two sets of collector plates, indicated generally at **15** and **16**, are mounted within the frame as shown in Figures 2 and 3. The exact construction of the collector plates forms no part of the present invention, but the collector plates are illustrated as being of the construction more particularly described and claimed in my co-pending application Serial No. 534,985, filed Sept. 19, 1955. As shown, collector plates **15** are of a size to substantially fill the space within the frame with their corners terminating closely adjacent to the cross rods or tubes **14**. These collector plates may be directly connected to the rods or tubes **14** by fastenings **17**, such as metal clips or loops of wire. When the cross rods or tubes **14** are formed of conducting material, the several collector plates **15** will be electrically connected directly through the cross rods or tubes. When non-conducting cross rods or tubes are employed the collector plates **15** may be connected together electrically by separate wires or straps.

The collector plates **16** are smaller in area than the plates **15** so that their corners lie spaced from the cross rods or tubes **14**, as shown. To mount the collector plates **16**, insulating mountings, indicated generally at **18**, may be employed secured through wires or clips **19** to the cross rods or tubes **14** and secured through similar wires or clips **21** to the corners of the collector plates **16**. The insulating mountings **18** may be constructed as more particularly described and claimed in my co-pending application, Serial No. 539,480, filed Oct. 10, 1955, and as shown comprise flat sheets of insulating material slotted alternately from their opposite edges to produce an insulating structure having a certain degree of resiliency as well as good insulating properties. In this way, the plates **16** are securely supported within the frame and are accurately held in spaced parallel relation to the plates **15** while being insulated therefrom. The plates **15** are connected to each other by a wire or strap **22** which is in turn connected to one side of a suitable source of voltage **23**, the opposite side of which is connected to the frame. It will be apparent that when the cross rods or tubes **14** are of insulating material, all of the plates can be constructed and mounted in the manner shown for the plates **16** with alternate plates connected together and to one side of a voltage source.

It will be seen that the frame for the present invention can be very easily assembled with the plates properly supported therein by slipping the cross rods or tubes **14** through the fastenings **17** and **19** and then slipping the end projections **13** of the frame members into the ends of the cross rods or tubes. When so assembled, the complete frame unit with the plates mounted therein can be easily inserted into a suitable housing or casing for operation. For cleaning or replacement of the plates, the frame assembly can be removed from the housing or casing and the plates can easily and quickly be detached therefrom all without the use of any tools or special equipment.

While one embodiment of the invention has been shown and described herein, it will be understood that it is illustrative only and not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. In an electric precipitator, a frame comprising a pair of spaced parallel end members rectangular in outline connected at their corners by four spaced parallel rods, two sets of rectangular electrically conductive collector plates alternating in spaced parallel relationship between and parallel to the end members and peripherally within the rods, fastening means securing the corners of the collector plates to the rods, and means for electrically insulating the plates of different sets from each other.

2. In an electric precipitator, a frame comprising a pair of spaced parallel end members rectangular in outline connected at their corners by four spaced parallel rods, two sets of rectangular electrically conductive collector plates alternating in spaced parallel relationship between and parallel to the end members and peripherally within the rods, fastening means securing the corners of the plates of one set directly to the rods in electrically conductive relation thereto, and insulating fastening means securing the corners of the plates of the other set to the rods to insulate the plates of the two sets from each other.

3. In an electric precipitator, a frame comprising a pair of end members each formed of crossed rods with the ends of the rods on each end member extending in the same direction therefrom at right angles thereto, the end members being positioned in reversed relationship to each other so that the ends of the rods on each end member face and are aligned with the ends of the rods on the other end member, tubes at each corner of the end members in which the aligned ends of the rods are received respectively, two sets of electrically conductive collector plates alternating in spaced parallel relationship between and parallel to the end members, and fastening means securing the plates to the tubes to support the plates in the frame.

4. In an electric precipitator, a frame comprising a pair of end members each formed of crossed rods with the ends of the rods on each end member extending in the same direction therefrom at right angles thereto, the end members being positioned in reversed relationship to each other so that the ends of the rods on each end member face and are aligned with the ends of the rods on the other end member, tubes at each corner of the end members in which the aligned ends of the rods are received respectively, two sets of electrically conductive collector plates alternating in spaced parallel relationship between and parallel to the end members, fastening means securing the plates of one set directly to the tubes in electrically conductive relationship thereto, and insulated fastening means to secure the plates of the other set to the tubes to insulate the plates of the two sets from each other.

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