April 19, 1932. J. R. GIES 1,854,650

COLLECTING ELECTRODE FOR ELECTRICAL PRECIPITATION APPARATUS

Filed May 15, 1930

Fig.1.

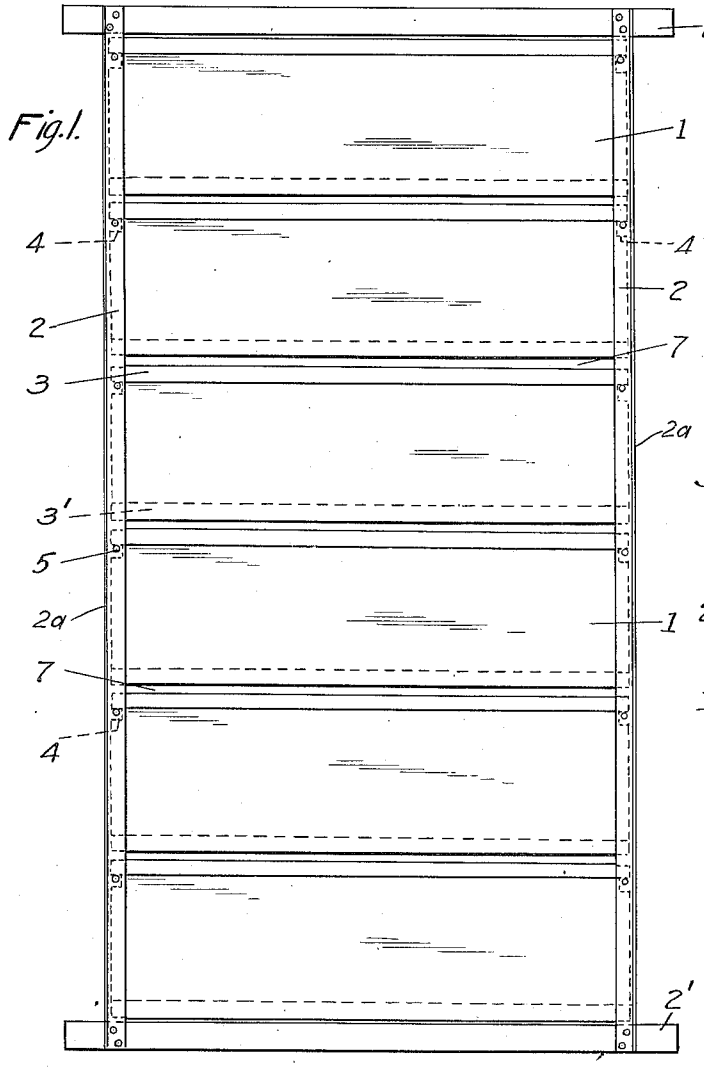
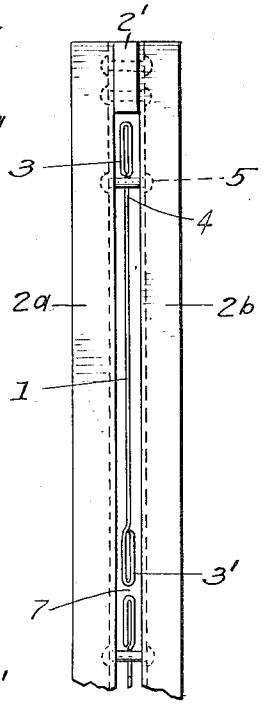


Fig.2.



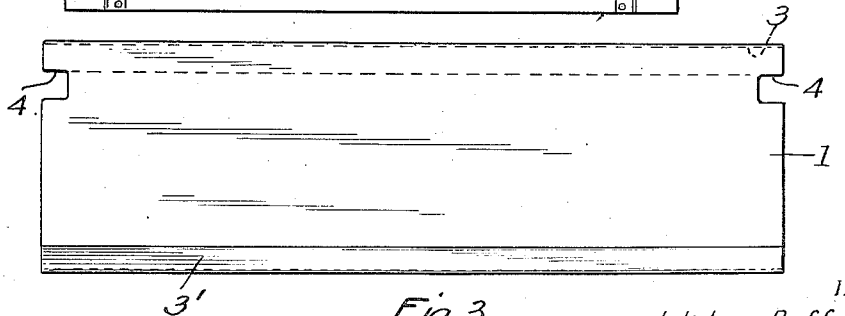


Fig.3.

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UNITED STATES PATENT OFFICE

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COLLECTING ELECTRODE FOR ELECTRICAL PRECIPITATION APPARATUS

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This invention relates to a novel and advantageous construction of a collecting electrode for electrical precipitators, and particularly to a collecting electrode whose surface area is subdivided into strips extending side by side throughout one dimension of the collecting electrode.

The principal object of the invention is to provide a collecting electrode which will be substantially free from warping and whose surfaces will thus be maintained substantially in the desired plane at all times.

According to this invention, the above object is accomplished by reenforcing the strips longitudinally thereof and supporting the strips loosely and independently in a suitable supporting frame, so that they may expand on all sides, independently of each other. By means of this construction any tendency toward warping of the strips longitudinally thereof, as for example due to heating thereof by hot gases passing through the precipitator, is prevented or minimized by the reenforcing means extending longitudinally of the strips, and furthermore, the loose support of the independent strips in the frame means allows free expansion thereof in case of such heating and thus further eliminates or minimizes the tendency to warping. The width of the individual strips, in a direction perpendicular to the length thereof is sufficiently small to prevent any appreciable or objectionable warping in that direction.

The accompanying drawings illustrate a collecting electrode according to this invention, and referring thereto:

Fig. 1 is a side elevation of such an electrode.

Fig. 2 is an end elevation thereof, taken from the right end in Fig. 1.

Fig. 3 is a side elevation of one of the individual strips.

The collecting electrode shown in the drawings is formed of a plurality of separate flat strips or sections 1 of sheet metal or other suitable material extending side by side in a common plane, supported on a frame including vertical side members 2 and horizontal top and bottom members 2′. Said frame members may be secured together in any suitable manner to form a frame of rectangular shape, and the electrode strips 1, are supported therein loosely and independently of one another but sufficiently close together to provide substantially continuous plane collecting electrode surfaces at both faces of the electrode. The vertical members of the supporting frame are shown as comprising two slightly spaced vertically extending angle bars or other elongated members 2*a* and 2*b* extending throughout the height of the electrode at each side thereof.

Each of the strips 1 is reenforced longitudinally by top and bottom reenforcing means 3 and 3′ respectively, said reenforcing means being formed for example by bending over the upper and lower edge portions of each strip, as shown for example in Fig. 2. Said electrode strips may be supported on the side members 2 of the supporting frame in various ways but are shown as projecting at each side between the spaced vertical frame members 2*a* and 2*b* and supported by means of bolts, pins, rivets, or other supporting members 5 extending between said frame members and through slots or notches 4 adjacent the two upper corners of each strip. The upper edge of each of said slots or notches 4 rests upon the corresponding supporting member 5, but the inner edges of the respective slots preferably do not bear tightly against the members 5 and said supporting members are otherwise free from engagement with said strips. Furthermore, a relatively narrow space indicated at 7 is provided between each pair of adjacent strips, so that the strips are free to expand in all directions upon heating thereof.

It will be understood that the collecting electrode such as above described is adapted for use in electrical precipitators of any suitable or well known construction and that when so used, the gases to be freed of suspended matter are passed between parallel collecting electrodes of this type, between which discharge electrode means are suspended in the usual manner and that a high electric potential is maintained between the discharge and collecting electrodes, so as to effect precipitation of the suspended material

principally upon the collecting electrode surfaces, in well known manner. The electric potential is preferably, though not essentially, unidirectional. It is well known that the precipitation of the suspended material is dependent upon the maintenance of a silent or corona discharge from the discharge electrode means and that the maintenance of such discharge is in turn dependent upon the maintenance of a certain relatively high potential difference somewhat less than the potential difference which would effect arcing or disruptive discharge between the electrodes. In order that satisfactory corona discharge may be maintained from all parts of the discharge electrode system, without causing arcing or disruptive discharge from any portion thereof, it will be seen that it is highly desirable to maintain uniform spacing of all portions of the discharge electrode means from the collecting electrode means. Any substantial amount of warping of the collecting electrodes, due for example to heating thereof by hot gases, would tend to destroy this uniformity of spacing and thus impair the efficiency of operation of the precipitator. When collecting electrodes formed of large continuous rigidly supported plates are used, it has been found that serious warping sometimes occurs when the temperature of the gases is relatively high, and it is the chief purpose of the present invention to overcome this defect and prevent such electrical disturbances due to warping of the collecting electrodes.

I claim:

1. In electrical precipitation apparatus, a collecting electrode comprising a supporting frame consisting of horizontal top and bottom members and vertical side members, each vertical side member comprising two bars spaced apart and provided with plate supporting means extending between them, a plurality of strips extending one above another in a common plane, and supported loosely and independently on said frame, said strips being formed as plate sections extending between the said bars of the vertical side members and being provided with notches engaging said plate supporting means on said side members, whereby said strips are so mounted with respect to said frame members and to one another as to permit free expansion thereof in all directions upon heating.

2. In apparatus for electrical precipitation, supporting means, a plurality of vertical plate sections arranged one above another and independently and loosely supported on said supporting means substantially in a common plane with their adjacent edges free of one another so as to permit free expansion and contraction of the plate sections in a vertical direction but sufficiently close together to provide substantially continuous collecting electrode surfaces extending over the entire area of said sections.

In testimony whereof I have hereunto subscribed my name this 23rd day of April, 1930.

JAKOBUS RAFFAEL GIES.