July 8, 1952 R. RAPER 2,602,519

PRECIPITATOR COLLECTING ELECTRODE

Filed July 14, 1948

Fig. 1.

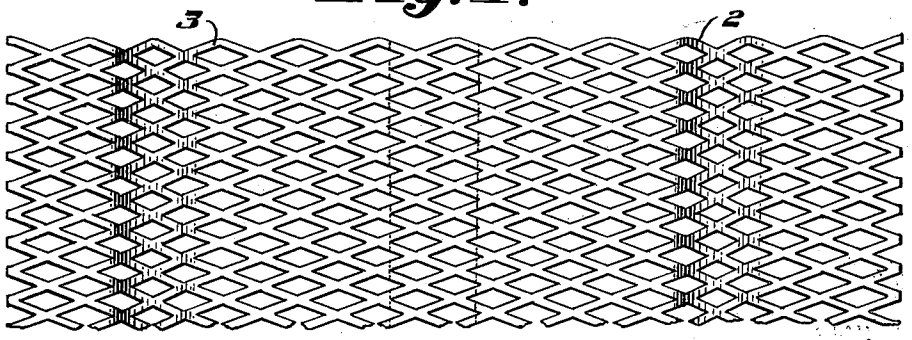


Fig. 2.

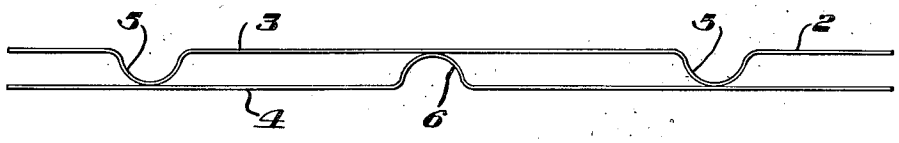


Fig. 3.

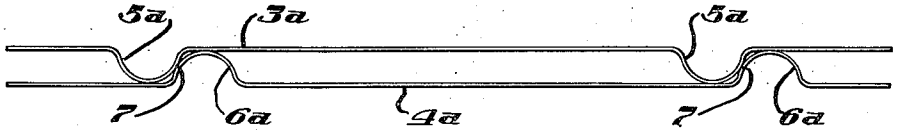
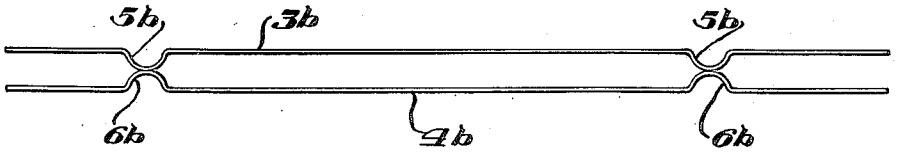


Fig. 4.



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PRECIPITATOR COLLECTING ELECTRODE

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3 Claims. (Cl. 183—7)

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This invention relates to precipitator collecting electrodes. It has to do with electrodes for collecting solid particles removed from gases in electrical precipitators.

It is known that precipitator collecting electrodes, which are of sheet form, should be rigid and flat and parallel to each other in order to permit of the employment of maximum voltage in the electrostatic field creating electrodes without arcing across to the collecting electrodes. If the collecting electrodes are not flat localized projecting portions of them which extend relatively close to the field creating electrodes may induce arcing across the gap, necessitating reduction of voltage and hence relatively inefficient operation.

The collecting electrodes should at the same time be strong and rugged to withstand the shocks to which they are subjected when the particles clinging to them are removed by striking or vibrating them.

I have devised certain novel forms of precipitator collecting electrode which are flat, strong and rugged yet light in weight, easily handled and economical to manufacture.

I provide a precipitator collecting electrode comprising a plurality of thicknesses of foraminous metal disposed in substantial parallelism with space between adjacent thicknesses, the thicknesses being braced against one another and connected together to form a substantially rigid unit. I desirably employ expanded metal to make the electrode. The expanded metal is preferably flattened so that it becomes in effect cold worked foraminous sheet metal having strands and bonds forming diamonds of the shape of the characteristic diamonds of expanded metal. The expanded metal may be flattened by passing it through a stand of rolls of a cold rolling mill.

My precipitator collecting electrode preferably comprises two sheets of foraminous metal arranged in generally parallel relationship, at least one of the sheets having formed therein a plurality of elongated channels projecting in the same direction from the general plane of the sheet with the metal intermediate channels stretched taut to insure flatness of the sheet, the channels engaging the other sheet whereby to space apart the bodies of the sheets, and connecting means connecting the sheets together to form a unit. The connecting means preferably comprise welds at the channels permanently connecting the sheets together. Desirably each of the sheets has formed therein a plurality of

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elongated channels and the channels of each sheet engage the other sheet.

Other details, objects and advantages of the invention will become apparent as the following description of certain present preferred embodiments thereof proceeds.

In the accompanying drawings I have shown certain present preferred embodiments of the invention in which

Figure 1 is a fragmentary plan view of a precipitator collecting electrode;

Figure 2 is an edge view of the electrode shown in Figure 1;

Figure 3 is an edge view of a modified form of electrode; and

Figure 4 is an edge view of a further modified form of electrode.

Referring first to Figures 1 and 2, there is shown a precipitator collecting electrode designated generally by reference numeral 2 comprising two thicknesses 3 and 4 of flattened expanded metal. In the form shown each thickness of metal is a separate sheet. The sheets are arranged in substantial parallelism. Each sheet has one or more portions deformed toward the other sheet. Sheet 3 is shown as having two parallel generally channel shaped portions 5 deformed toward sheet 4 and sheet 4 is shown as having one generally channel shaped deformed portion 6 extending toward the sheet 3. The channel 6 is shown as being halfway between the channels 5. All of the channels 5 and 6 are of the same depth perpendicular to the plane of the electrode so that with the sheets lying flat and parallel with the crests of the channels 5 in contact with undeformed portions of the sheet 4 the crest of the channel 6 is in contact with an undeformed portion of the sheet 3. The electrode may be of any desired size and each sheet may have any desired number of channels.

The channels are preferably formed in a press, the channel forming action to some extent stretching the metal intermediate channels to insure flatness of the sheets. The sheets are braced against each other and connected together to form a substantially rigid unit. The sheets may be connected together in various ways but I prefer to weld them together at the crests of the channels. The welds need not be continuous along the channels and, in fact, when expanded metal is employed will not ordinarily be continuous because of the foraminous nature of the metal.

The electrode of Figures 1 and 2 is shown as

being frameless. Ordinarily it is not necessary to provide a frame around the electrode made as explained in connection with Figures 1 and 2 although the electrode may be framed if desired. An advantage in not framing the electrode is that when it is unframed there is less horizontal surface area to catch solid particles falling from the electrode. When the electrodes are shocked or vibrated to dislodge the particles adhering thereto it is desired that those particles drop free of the electrodes.

Electrodes such as that of Figures 1 and 2 are especially strong due to the cold working of the metal in forming the channels. When flattened expanded metal is used the sheets are doubly cold worked, first in flattening the expanded metal and second in forming the channels. The channel forming operation not only forms the channels and cold works the metal but also insures complete flatness of the sheet intermediate the channels which is one of the considerations in the formation of precipitator collecting electrodes as above explained.

The welding of the sheets together may be accomplished by any suitable welding procedure such as resistance welding or spot welding. Since both sheets are of the same gage a sound weld is easily formed without inducing substantial stresses in either sheet as is likely to occur when a thin metal member is welded to a comparatively heavy member. Thus my electrodes are unprecedentedly flat, strong, light in weight and long lasting.

The electrode shown in Figure 3 differs from that of Figures 1 and 2 in that the deformed portions of the respective sheets lie adjacent and in contact with one another. In Figure 3 a sheet **3***a* has deformed channels **5***a* and a sheet **4***a* has deformed channels **6***a*. The channels **5***a* are spaced apart the same distance as the channels **6***a* and when the sheets are assembled with the channels of each sheet engaging the other sheet the channels of the respective sheets also engage each other as shown. The sheets may be welded together either at the crests of the channels or at the points where the channels of the respective sheets engage each other such as the points **7**. The electrode of Figure 3 is especially strong and well adapted to withstand shocking or vibration to dislodge particles.

Figure 4 shows another form of electrode having sheets **3***b* and **4***b*, the sheet **3***b* having channels **5***b* and the sheet **4***b* having channels **6***b*. The channels **5***b* are spaced apart the same distance as the channels **6***b* and when the sheets are assembled the crests of the channels **5***b* are brought opposite and in contact with the crests of the channels **6***b*. Desirably the sheets are welded together where the crests of the channels **5***b* engage the crests of the channels **6***b*. With a structure of this type if the distance between the sheets is to be equal to the distance between the sheets in structures formed according to Figure 2 or Figure 3 the channels must be of half the depth of the channels of Figures 2 and 3 as in the structure of Figure 4 the spacing apart of the sheets is determined by the sum of the depths of the channels.

While I have shown and described certain present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. A precipitator collecting electrode comprising two sheets of foraminous metal arranged in generally parallel relationship, at least one of the sheets having formed therein a plurality of elongated channels projecting in the same direction from the general plane of the sheet with the metal intermediate channels stretched to insure flatness of the sheet, the channels engaging the other sheet whereby to space apart the bodies of the sheets, and connecting means connecting the sheets together to form a unit.

2. A precipitator collecting electrode comprising two sheets of foraminous metal arranged in generally parallel relationship, at least one of the sheets having formed therein a plurality of elongated channels projecting in the same direction from the general plane of the sheet with the metal intermediate channels stretched to insure flatness of the sheet, the channels engaging the other sheet whereby to space apart the bodies of the sheets, and welds at the channels permanently connecting the sheets together.

3. A precipitator collecting electrode comprising two sheets of foraminous metal arranged in generally parallel relationship, each of the sheets having formed therein a plurality of elongated channels projecting in the same direction from the general plane of the sheet with the metal intermediate channels stretched to insure flatness of the sheet, the channels of each sheet engaging the other sheet whereby to space apart the bodies of the sheets, and welds at the channels permanently connecting the sheets together.

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