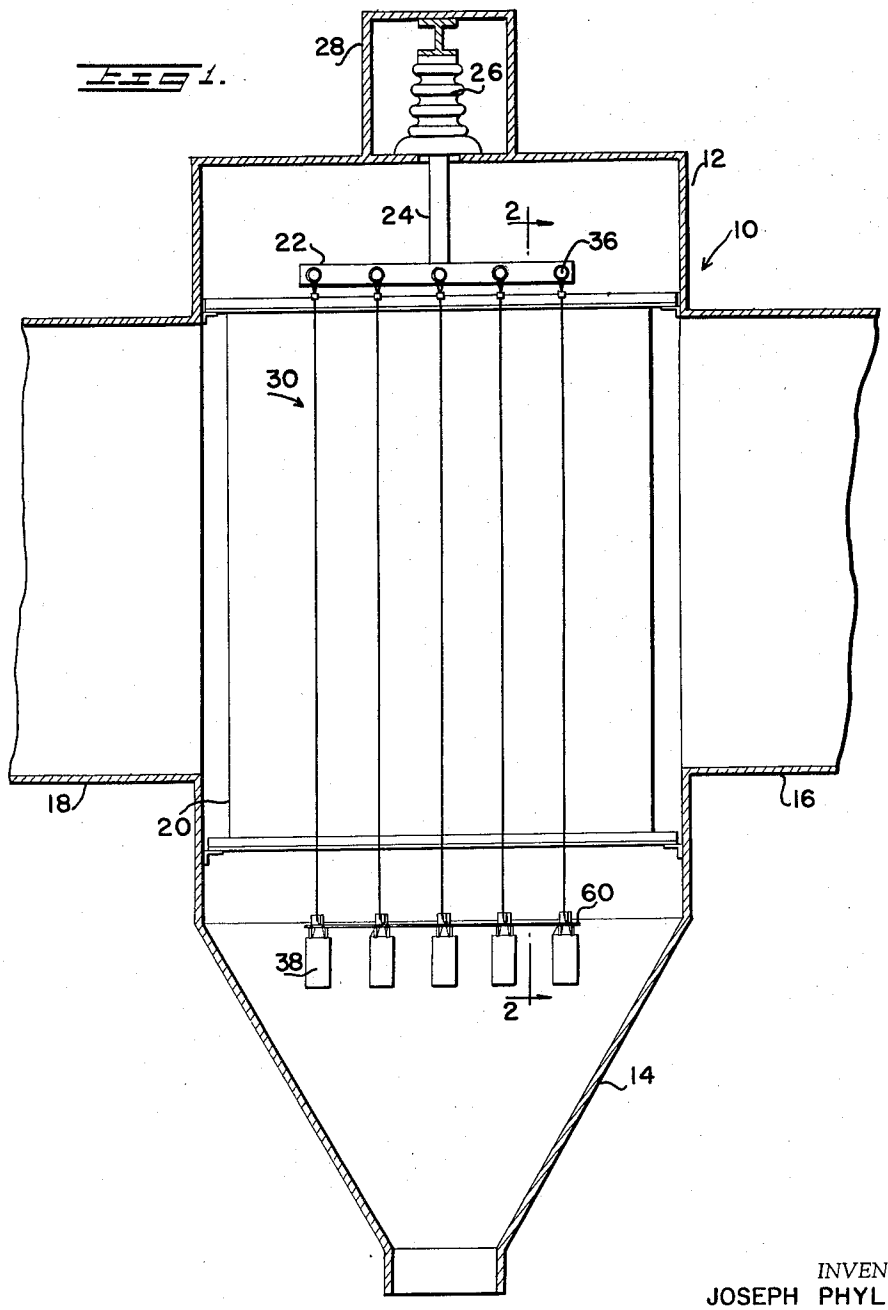
Nov. 8, 1960 J. PHYL ET AL 2,959,246

DISCHARGE ELECTRODE TENSIONING MEANS

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Fig 1.



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Fig 2.

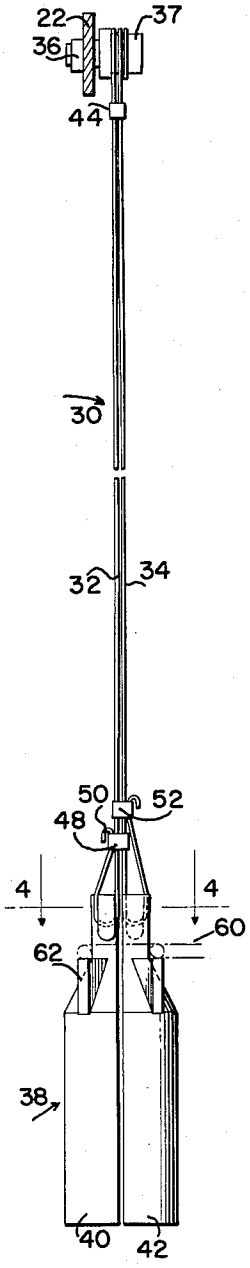
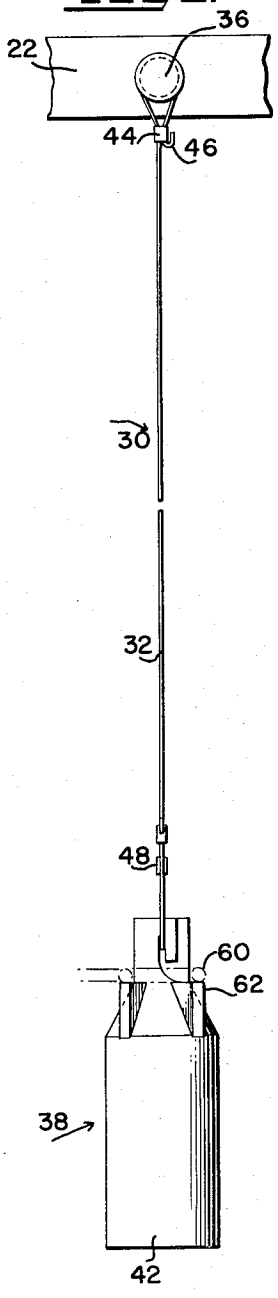


Fig 3.



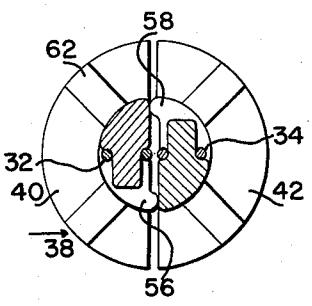
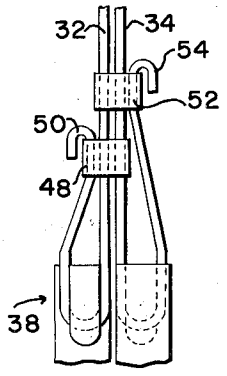


Fig 4.

Fig 5.



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DISCHARGE ELECTRODE TENSIONING MEANS

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5 Claims. (Cl. 183—7)

The present invention relates to electrical precipitation apparatus and more particularly and specifically to new and useful improvements in dual discharge electrode tensioning means for such apparatus.

In conventional precipitator construction, it has been the practice to suspend discharge electrodes from a high tension frame by a resilient or rigid coupling of one type or another and to weight the bottom free hanging ends of the electrodes to assist in maintaining the electrodes in vertical alignment within the precipitator.

However, with the employment of dual discharge electrode assemblies rather than the conventional single discharge electrodes, certain difficulties have been presented. A major difficulty has been the attainment of equal tension on the individual electrode wires of a single assembly.

In order to obtain the maximum efficiency of an electrical precipitator, equal tension is necessary in each wire.

The present invention has for one of its principal objects the production of a simple and effective means for obtaining equal tension in the individual discharge electrode wires of an assembly comprised of more than one wire.

Certain other advantages and objects of the invention will become readily apparent to one skilled in the art when the following description is read in light of the accompanying drawings.

The nature of the present invention may be stated in general terms as relating to a discharge electrode assembly for electrical precipitators which includes in combination a high tension frame and a plurality of parallel discharge electrode units depending from the frame, each of the electrode units comprising at least two electrode wires, the combination with said assembly of a weight for each of said electrode units connected to the electrode wires thereof, each of said weights consisting of at least a pair of cooperating sections for maintaining equal tension on the electrode wires of each unit.

Referring now to the accompanying drawings in which like numerals designate similar parts throughout the several veiws:

Figure 1 is a side elevational sectional view incorporating the tensioning means constituting the present invention.

Figure 2 is a fragmentary sectional view of one of the discharge electrode tensioning means of the present invention taken along line 2—2 of Figure 1.

Figure 3 is an enlarged front elevational view of the tensioning means shown in Figure 2.

Figure 4 is a sectional view of the tensioning means constituting the invention taken along line 4—4 of Figure 2.

Figure 5 is an enlarged fragmentary view of the means for retaining the individual discharge electrode wires in the tensioning weights of the invention.

Referring to Figure 1 of the drawings, there is disclosed a typical electrical gas precipitator **10** which includes a housing **12** having a hopper type discharge bottom **14** together with a clean gas outlet **16** on one side thereof and a dirty gas inlet **18** on the opposite side thereof. A plurality of collecting electrode plates **20** is supported in conventional manner in spaced parallel relationship transversely of the precipitator housing in alignment intermediate the dirty gas inlet and the clean gas outlet thereof.

Associated with the parallel spaced collecting plate electrodes is a plurality of rigid frame members **22** which are supported vertically within the housing in parallel spaced relationship to and equidistant between adjacent spaced collecting electrode plates. The frame members **22** are supported from the usual high tension frame **24** which is mounted in the upper end of the precipitator housing by a conventional insulator support **26** carried within a housing **28** on the top or upper end of the precipitator housing **12**.

Associated with each of the rigid frames **22** is a plurality of discharge electrode assemblies **30** each comprised of a pair of electrode wires **32** and **34** clearly illustrated in Figure 2. Each of the electrode wire assemblies is secured to the frame **22** by a coupling or shoulder bolt **36** provided with a spool **37**. The discharge electrode assemblies **30** are each maintained in tension by a weight assembly **38**. Each of the weight assemblies **38** is comprised of two individual elements **40** and **42** which are individually connected to the discharge electrodes **32** and **34**, respectively.

Referring in particular to Figures 2 and 3 of the drawings, it is seen that the upper ends of the discharge electrode wires **32** and **34** are looped around the spool **37** of the bolt **36** and are firmly maintained thereon and locked together by a ferrule **44**. To further insure that the discharge electrode wires **32** and **34** do not experience any relative movement, the ends of the wires may be turned back upon themselves, as shown in Figure 3, to form a hook portion **46** fitting around the outer surface of the ferrule **44**.

To obtain equal tension in each of the discharge electrode wires **32** and **34**, an individual section **40** or **42** of the weight assembly **38** is attached thereto. The individual elements **40** and **42** are identical with respect to one another and therefore for the sake of simplicity only a single one will be described in detail.

The element **40** of the weight **38** consists principally of an elongate body portion which tapers to a reduced neck and terminates in a hook-like upper end adapted to receive the lower end of its respective electrode wire **32**. The lower end of electrode wire is formed into a loop by being folded upwardly and is held in place by a ferrule **48**. The ferrule **48** is adapted to enclose or surround two thicknesses of the wire **32** and also one thickness of the adjacent wire **34**. In order to permit freedom of relative longitudinal movement of the wires **32** and **34**, the ferrule **48** is not clamped tightly on the encompassed wire thicknesses. Instead, it will be noted, the free end of the wire **32** is folded back upon itself to form a hook portion **50** which fits around the top of the ferrule **48**.

The adjacent electrode wire **34** is formed similarly to the wire **32**. The lower portion thereof is formed into a loop by being folded upwardly and is held in place by a ferrule **52** which is adapted to surround two thicknesses of the wire **34** and also one thickness of the adjacent wire **32**. In order to permit freedom of relative longitudinal movement of the wires **32** and **34**, the ferrule **52**, like the ferrule **48**, is not clamped tightly on the encompassed wire thicknesses. Instead, the free end of the wire **34** is folded back upon itself to form a hook portion **54** which fits around the top of the ferrule **52**.

Equal tension of the individual electrode wires **32**

and 34 is accomplished by the individual weight elements 40 and 42 which are free to move longitudinally with respect to one another. However, these weight elements must be held in close proximity to provide for a minimum spacing between their associated electrode wires and care must still be taken to avoid the freezing or sticking at zones where two flat areas of the weight elements lie against each other. Therefore, the elements 40 and 42 are provided with vertical rib projections 56 and 58, respectively, which maintain a minimum of surface contact between the weight elements.

It is also important to note that the hook-like upper end portions of the weight elements 40 and 42 in each instance are offset in a direction toward the cooperating weight sections from a vertical line passing through the center of gravity of the weight, thus causing the weight elements to rock together about their suspension points at the bottom of the loops of the electrode wires 32 and 34. Manifestly, the above described method of suspending the weight elements eliminates the need for any auxiliary means to hold the weight elements together.

In order to avoid any swinging of the discharge electrode wire assemblies 30 and their associated tensioning weights, a conventional steadying frame 60 is employed. The steadying frame 60 is adapted to rest on a plurality of radially extending shoulders 62 of the individual weight elements 40 and 42.

It will be readily understood by those skilled in the art that although the discharge electrode wires illustrated and described herein are round, satisfactory results could likewise be achieved with the use of electrode wires having other cross-sectional configurations such as for example square, rectangular, and twisted.

Further, it will be apparent that certain other modifications of the invention described could be made without departing from the spirit of the invention. Among the more obvious modifications is with respect to the upper ends of the weight sections 40 and 42. While hook-like configuration is advantageous and provides for easy installation and also dismantlement, the upper ends of these weights could be formed with a bore of sufficient diameter to receive their respective electrode wires.

According to the provisions of the patent statutes, we have explained the principles and mode of operation of our invention, and as illustrated and described what we now consider to represent its best embodiment. However, we desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

1. In a discharge electrode assembly for an electrical precipitator comprising a high tension frame and a plurality of parallel discharge electrode units depending from the frame, each of the electrode units comprising at least two electrode wires, the combination with said assembly of a weight for each of said electrode units connected to the electrode wires thereof, each of said weights consisting of at least a pair of cooperating elements for maintaining equal tension on the electrode wires of each unit and means for maintaining the lower portion of said electrode wires in close proximity and slidable relative to one another.

2. The combination claimed in claim 1 wherein said electrode wires are connected to said weight elements at a point offset in a direction toward the other of said elements from a line passing through the center of gravity of said element.

3. The combination claimed in claim 2 wherein each of said weight elements is provided with a spacing member disposed to abut against the other weight element to thereby present a minimum surface contact between the said cooperating elements.

4. A tensioning weight element for dual discharge electrode wires in electrical precipitator apparatus comprising a weight assembly including a pair of weight elements, each of said elements provided with suspension means for attaching to its associated discharge electrode, said means being offset in a direction toward the other of said elements from a line passing through the center of gravity of said element, and means for maintaining at least the upper portions of said elements in close proximity of one another.

5. The combination claimed in claim 4 wherein said means are offset in such a manner that the discharge electrodes contact each other in their entire length to thereby secure maximum corona discharge.

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