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ELECTROSTATIC SEPARATOR FOR INFLAMMABLE MATERIALS.
APPLICATION FILED OCT. 27, 1914.

1,222,305.

Patented Apr. 10, 1917.

Fig. 1.

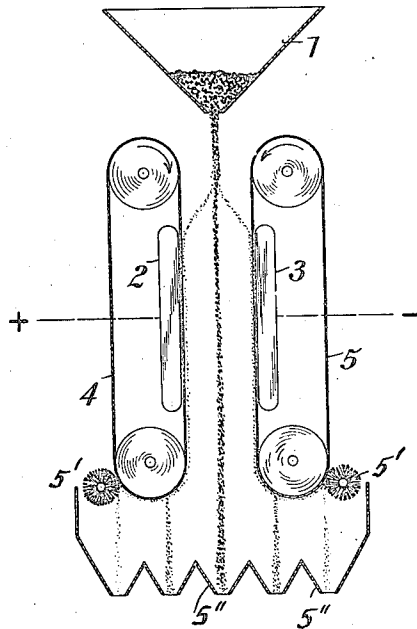
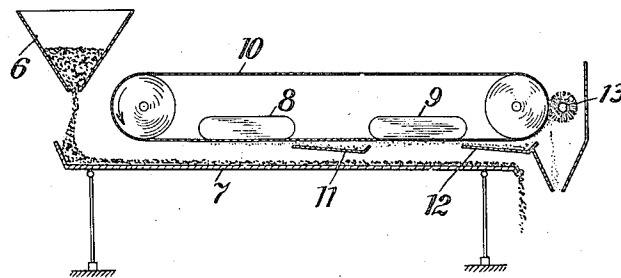


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAKOB KRAUS, OF BRUNSWICK, GERMANY.

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1,222,305.

Specification of Letters Patent.

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Application filed October 27, 1914. Serial No. 868,859.

To all whom it may concern:

Be it known that I, JAKOB KRAUS, a citizen of the German Empire, and a resident of Brunswick, Germany, have invented certain new and useful Improvements in Electrostatic Separators for Inflammable Materials, of which the following is a specification.

Electrostatic separators as constructed hitherto, are open to the serious objection that strong sparking may be caused by the intentional or accidental discharge of the electrodes or carriers of electricity employed for the formation of the electrostatic field. While these sparks may not interfere with the effectiveness of the separating process, as in the case of treating ores, minerals, soils, and the like, there is the economical disadvantage that factories employing such machines liable to produce sparks, are classed as a high risk by the fire-insurance companies, with a correspondingly increased premium. In the case of substances liable to catch fire from electric sparks, or to explode when in a dust-like condition, the electrostatic process of separation was not available at all hitherto. It is true attempts were made to reduce this danger by careful and repeated sifting of the pulverulent material before the electric treatment, so as to avoid the formation of an explosive mixture of dust and air. However, the most perfect sifting will not safeguard against explosion in such cases, for the reason that dust will be formed during the electrostatic treatment, by the mutual friction of the particles of material.

The object of my present invention is to provide an electrostatic separator in which the electrodes or poles serving to form the electrostatic field will be made of such material as to entirely avoid the production of sparks or at least reduce it to a minimum which is harmless in practice.

A metallic electrode (say, made of zinc), if charged with from 8000 to 10000 volts, cannot be discharged without a heavy production of sparks. Experiments have shown, however, that if the poles or electrodes are made of relatively poor conductors (semi-conductors), such as wood, marble, paper, or the like, even voltages of from 12000 to 15000 will not produce any sparks visible in daylight. If I employ substances such as glass, parchment, or the like, which are very poor conductors and practically

non-conductors of electricity, to form the electrodes or carriers of electrical energy, the operation will be perfectly free from sparks, as I have found by actual test.

Thus, if the electrodes or carriers of electrical energy of an electrostatic separator are made of substances which are semi-conductors or non-conductors, such a separator may be employed with perfect safety for the treatment of material of an inflammable or explosive character.

In the accompanying drawings I have shown in diagrammatic fashion, two examples of apparatus embodying my invention, each of Figures 1 and 2 being a vertical section of such apparatus.

In Fig. 1, the material to be treated passes from a hopper 1, under the influence of gravity alone, so as to fall in a vertical path, into and through the electrostatic field formed by the stationary electrodes 2 and 3 located at opposite sides of said vertical path. Between the electrodes and the falling material are interposed endless dielectric conveyor bands 4 and 5 respectively, which carry the attracted particles away from the electrostatic field. Brushes 5' may be employed to strip off the particles adhering to the bands or belts 4 and 5, said particles, according to their different behavior, being received in collectors 5'' one of which is located vertically beneath the hopper 1, and the others at varying distances from such central collector. The electrodes 2 and 3 are made of a semi-conductor, or of a non-conductor, and are connected with a suitable source of static electricity to charge them.

In the apparatus shown in Fig. 2, the material falls from a hopper 6 on a shaking pan or conveyor 7 of well-known character. On its upper side this pan is lined with a covering of sheet metal, say zinc or the like, and is connected with a source of static electricity to form a repelling pole. The attracting poles are formed, for instance, by two spaced stationary electrodes 8 and 9 arranged above the shaking pan 7. According to my present invention, these electrodes 8 and 9 are made of a semi-conductor or non-conductor, and are excited by an endless dielectric band or belt 10 which is in frictional contact with them and travels lengthwise. The electrodes 8 and 9 receive a polarity opposite to that of the pan 7, and the belt 10 passes between the pan and said electrodes, so that the particles attracted by the

electrodes 8, 9 cannot come in contact there-
with. The attracted particles are carried
away by the belt 10 and are collected in
channels 11, 12, a brush 13 being employed,
5 if desired, to remove the remnant of mate-
rial adhering to the belt 10. The material
which is not attracted is discharged at the
end of the pan 7, as shown.

Various modifications may be made with-
10 out departing from the nature of my inven-
tion as set forth in the appended claim.

I claim:

An electrostatic separator, comprising an
electrode consisting of a poor conductor of
15 electricity, means for causing the material

to be treated to pass within the field of at-
traction of said electrode, and a dielectric
conveyer movable between said electrode and
the path of the material to prevent the mate-
rial from reaching the electrode and to carry 20
the attracted particles out of the electro-
static field.

In testimony whereof, I have signed this
specification in the presence of two subscrib-
ing witnesses.

JAKOB KRAUS.

Witnesses:

RUDOLF WAGENDER,
CARL KÄMPE.