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E. M. RANSBURG

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ELECTROSTATIC COATING APPARATUS

Original Filed March 16, 1946

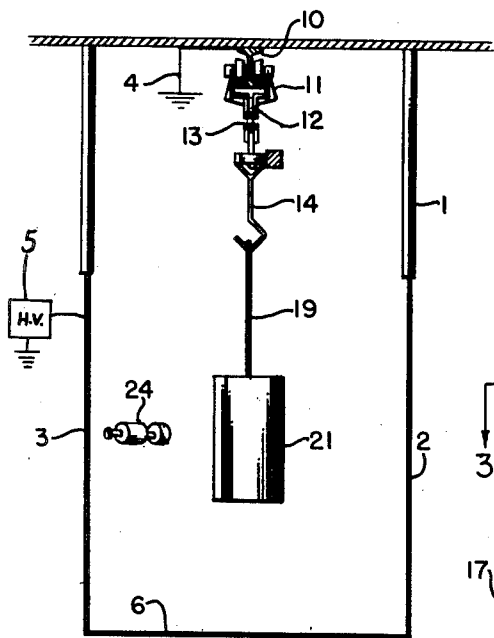


FIG. 1

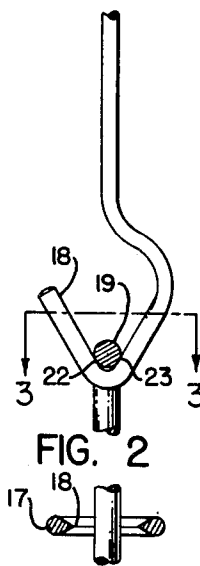


FIG. 2

FIG. 3

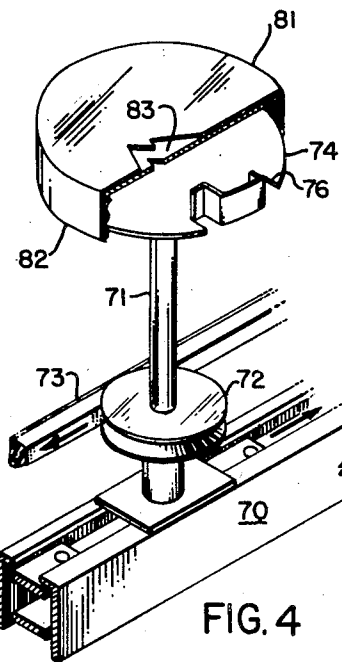


FIG. 4

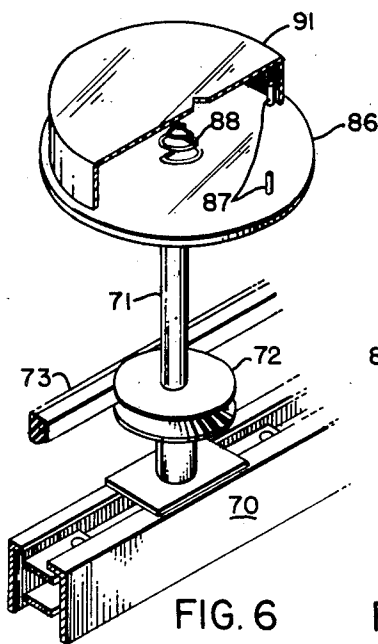


FIG. 6

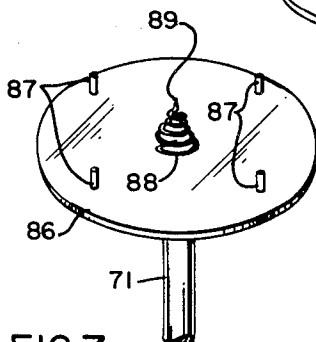


FIG. 7

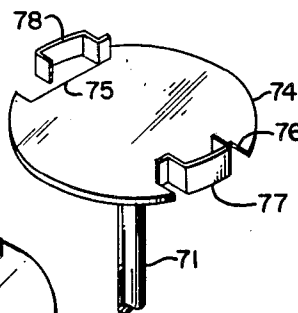


FIG. 5

INVENTOR.
EDWIN M. RANSBURG

BY

Harry E. Down
ATTORNEY

UNITED STATES PATENT OFFICE

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ELECTROSTATIC COATING APPARATUS

Edwin M. Ransburg, Indianapolis, Ind., assignor,
by mesne assignments, to Ransburg Electro-
Coating Corp., Indianapolis, Ind., a corporation
of Indiana

Original application March 16, 1946, Serial No.
654,830. Divided and this application Novem-
ber 18, 1950, Serial No. 196,374

3 Claims. (Cl. 118—51)

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This application is a division of my applica-
tion Serial No. 654,830, filed March 16, 1946,
which is now abandoned.

This invention relates to the coating of articles
in an electrostatic field and more particularly to
a means for supporting and maintaining the
article as a terminal of the electrostatic field
during the coating process.

In electrostatic coating apparatus in which the
article to be coated is supported on a grounded
conveyor and is moved past a high potential elec-
trode while liquid coating material is sprayed into
the zone surrounding the article, it is desirable
that a good electrical contact between the article
and conveyor be maintained. As any given sup-
port for articles is repeatedly returned to the
electrostatic coating field, it accumulates over a
period of time a considerable coating of paint,
which may prevent proper electrical contact of
subsequent articles therewith. Also when the
support passes through the coating zone without
any item hung thereon, the contacting portion
thereof may become coated. This prevents
proper electrical contact between the article and
conveyor which not only interferes with proper
coating, but also may allow the article to ac-
cumulate a capacity charge which may raise the
potential of the article high enough above ground
potential to cause a spark to the grounded con-
veyor, and create a fire hazard.

An object of this invention is to provide elec-
trostatic coating apparatus for applying a liquid
coating material to articles in which the articles
are always maintained as one terminal of an
electrostatic field.

Another object of this invention is to provide
a support for an article in an electrostatic ap-
paratus which insures that there is at all times
during the coating process a positive electrical
connection between the article and a terminal
of an electric circuit.

Another object of this invention is to provide
a support for an article in an electrostatic coat-
ing zone, which has a portion shielded to prevent
deposition of coating material thereon.

Another object of the invention is to provide in
an electrostatic coating apparatus a support for
an article to be coated which resiliently main-
tains an electrical connection therewith.

Another object of the invention is to provide in
an electrostatic coating apparatus a support
for an article to be coated that is so shaped that
the material accumulated on the contact portion
thereof will be held to a minimum.

The present invention will be described in

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greater detail in connection with the accom-
panying drawings in which are illustrated a pre-
ferred embodiment of the invention by way of
example, and in which:

Fig. 1 is an elevation of an electrostatic coat-
ing apparatus embodying an overhead conveyor,

Fig. 2 is an elevation of the hook support shown
in Fig. 1,

Fig. 3 is a cross sectional view taken on line
III—III of Fig. 2,

Fig. 4 is a perspective view of a further modi-
fication illustrating a modified form of conveyor,

Fig. 5 is a perspective view of a detail of Fig. 4,
Fig. 6 illustrates a further modification in per-
spective, and

Fig. 7 is a perspective view of a detail of Figure
6.

Referring to Figure 1, a plurality of insulator
posts 1, suitably support electrode frames 2 and
3 in any suitable arrangement. Each electrode
frame carries a plurality of fine wires, for ex-
ample, as illustrated in Figure 4 of the applica-
tion of Harold P. Ransburg, Serial No. 589,719
for Method for Coating Articles, filed April
23, 1945, now Patent No. 2,567,781, dated Septem-
ber 11, 1951. The frames are secured together by
bottom electrode portion 6. The electrode wires
are maintained by any suitable means, such as
high voltage source 5, at a high electrical poten-
tial of the order of one hundred thousand volts
and the conveyor chain is grounded as at 4.

I-beam 10 which provides a track for a trolley
11 and a bar 12 depending from the trolley is
engaged by a conveyor chain 13 by which it is
moved. An article support, indicated generally
at 14 depends from chain 13 and is preferably
in the form of a V-shaped metal hook having on
the inner surface a sharp edge 18 (Fig. 2) which
has a radius on the order of less than about $\frac{1}{32}$
inch. The ball 19 secured to the article 21, is
inserted into the hook 17 and rests on sharp
edge 18 at 22 and 23 (Figs. 2 and 3).

A spray nozzle 24 of any suitable type is sup-
ported to introduce into the electrostatic field be-
tween the article and electrodes, a stream of finely
divided material, such as a settlable finishing
fluid, preferably accompanied by a carrier air
stream, which is electrostatically deposited upon
the surface of the article 21 and the ball 19. By
reason of the sharp edges of the hook 18 engaging
the ball at 22 and 23, a good electrical connec-
tion therewith to ground is established. The
sharp edge 18 remains relatively free of paint
even when the hook is not loaded with an article,

due to the ionizing action of the sharp edge in the electrostatic field and the tendency of the liquid coating material to draw away from the edge.

In the modification illustrated in Figures 4 and 5, the overhead conveyor illustrated in Figure 1 is replaced by the conveyor 70 having spindles 71 extending upwardly therefrom, each spindle carrying a pulley 72 which is rotated by a traveling belt 73 or the like. The spindle 71 at its upper end carries a member of any suitable shape, shown as a metal plate 74 having cut out portions 75 and 76 which are crimped outwardly to form spring fingers 77 and 78. The object illustrated to be coated is a jar cap 81 having a threaded flange 82 and a cap liner 83 of insulation material which prevents the top of plate 74 from contacting the top of cap 81. However, when the cap is placed over the plate 74, the fingers 77 and 78 resiliently engage the threaded flange 82 on the interior and make electrical contact therewith. The resiliency of the fingers enables the cap to be easily removed from the support.

In the modification illustrated in Figures 6 and 7 the spindle 71 carries at its upper end a plate 86 having located about its edge a plurality of positioning pins 87. At the center of the plate there is suitably secured, as by soldering thereto, a spiral spring 88, the end of which may be pointed as indicated at 89. The object illustrated is a cake cover 91 to be coated on the exterior surface and remain uncoated on the interior. The cake cover 91 is placed upon the plate 86 and is more or less centered by the pins 87 on the interior thereof, while the spring 88 makes electrical contact with the cake cover. The disc portion 86 closes up the interior of the cake cover and prevents the entrance of coating material thereto. The spring 88 is pointed at 89 to present to the field an ionizing point which produces a corona discharge when not covered by an article. In this manner the point 89 which is the contact portion of the support will remain substantially free of coating material and insure good electrical contact between the support and the article to be coated.

The invention may be embodied in various other forms without departing from the spirit or scope thereof.

I claim:

1. In apparatus including a voltage source for electrostatically coating an electrically conducting article by exposing it to a spray of charged particles in a coating zone, the combination of a rigid support, a plurality of article-engaging portions carried by said support, resilient means acting between two of said portions and urging them apart when both engage the article, said article-engaging portions including one which is rigid and rigid with the support to locate the article relative to the support; one of the two portions between which said resilient means acts being electrically conductive and connected to said voltage source to maintain the article at an electrical potential substantially different from that of the charged particles.

2. The invention set forth in claim 1 with the addition that said rigid portion is a member adapted for reception in a hollow article, the two first mentioned portions being the free ends of resilient fingers mounted on opposite sides of said rigid portion.

3. In apparatus including a voltage source for electrostatically coating an electrically conducting article by exposing it to a spray of charged particles in a coating zone, the combination of a rigid support having a rigid portion adapted to support an article from below, a resilient member carried by said support and having a free end engageable with an article so supported and movable downwardly by the weight of the article, rigid abutment means on said support engageable with the article to locate it relative to the support, said resilient means being electrically conductive and connected to said voltage source to maintain the article at an electrical potential substantially different from that of the charged particles.

EDWIN M. RANSBURG.

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