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A. G. HARSCH

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NOZZLE

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*Fig. 1*

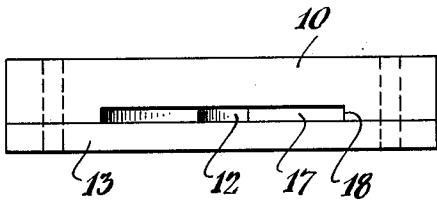


*Fig. 3*

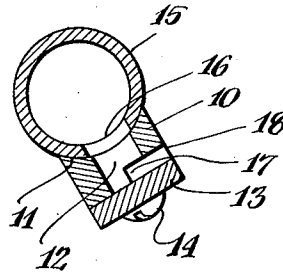


*Fig. 2*

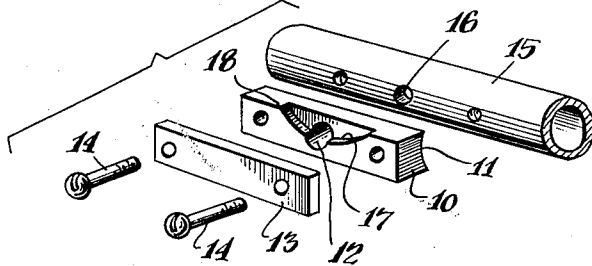
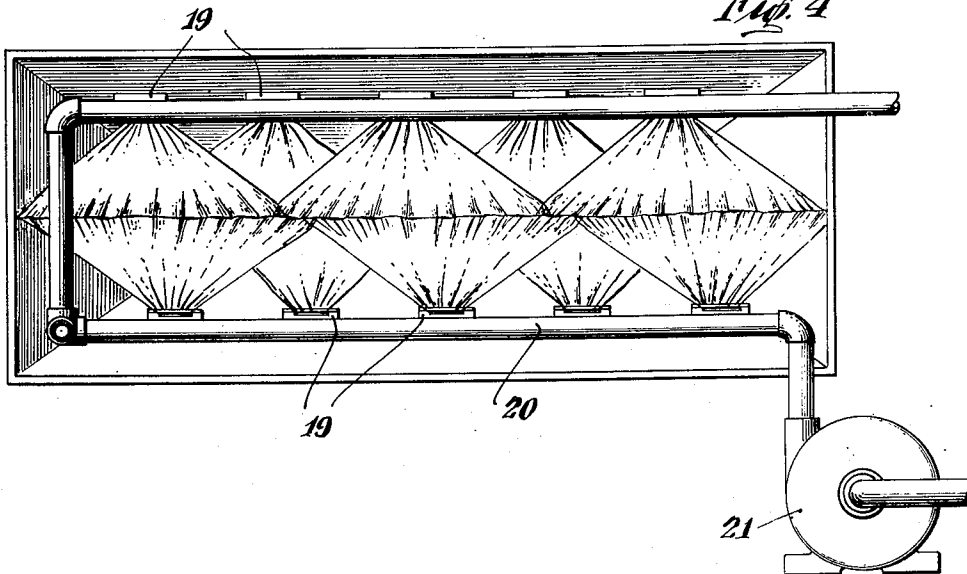


*Fig. 4*



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## UNITED STATES PATENT OFFICE

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## NOZZLE

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2 Claims. (Cl. 239-107)

My invention relates to nozzles for fluid coat-  
ing systems and more particularly to a nozzle  
constructed for effecting rapid, uniform coating  
of structures of complicated design, such as for  
example, coil bed springs, with a fan-like sheet of  
paint or other similar coating compositions.

The nozzle of my invention distinguishes in  
operation from the commonly used spray guns  
or spray nozzles that produce a fine mist, by  
producing instead a sheet or fan-like flow of the  
coating material which is not atomized into fine  
particles and which covers the treated surface by  
flowing in very wet form over the objects to be  
coated. Coating with my type of nozzle avoids  
the occurrence of bare or uncoated spots on the  
objects such as commonly occur with the con-  
centrated atomized forms of spray from the regu-  
lar spray nozzles.

A series of my nozzles arranged in opposing  
and preferably staggered relationship effect at  
the junction of the sheet of liquid issuing there-  
from a continuous, wet, coarse-rain-like flow of  
the coating liquid, which is adapted to cover a  
relatively large area of the surface to be coated  
as contrasted with the narrow zone or band  
commonly produced by the prior art nozzles.

The nozzle of my invention is characterized by  
simplicity of design, durability of construction and  
ease of assembly and installation and dis-assem-  
bly for cleaning; and produces in operation a  
fan-shaped sheet or film of material that is suffi-  
ciently liquid and wet to flow over the object to  
be coated. Because this nozzle produces a sub-  
stantially uniform liquid flow of the coating ma-  
terial without substantial atomization it mini-  
mizes evaporation losses and accordingly the cost  
of the coating. Also, by producing a substantially  
continuous uniform flow of the wet coating mate-  
rial it minimizes the usual labor and care re-  
quired for coating objects of intricate design  
which normally necessitate several applications  
or coatings to insure covering all the hidden sur-  
faces. My nozzle provides a sheet or film that in  
effect flows over the treated surface rather than  
statically depositing upon a restricted area such  
as normally results from a concentrated spray.

My nozzle does not contain any converging lips,  
which are normally used for atomizing or break-  
ing up the flow of liquid into a spray. Instead it  
has a wide fan or fish-tail shaped opening that  
shapes the flow of liquid without substantial in-  
terruption or breaking-up of the body of the  
liquid. A cover plate is provided to direct the  
shaped flow of material to the object to be coated.  
Bolts or other suitable means are provided for

attaching the cover plate to the member having  
the wide orifice and for attaching the latter to  
the conduit containing the coating material.

The details of the invention will be more fully  
understood by reference to the following descrip-  
tion taken in conjunction with the accompanying  
drawing in which

Fig. 1 is a side view of my nozzle showing the  
wide lateral opening;

Fig. 2 is an exploded view of the nozzle and a  
section of the associated feed line;

Fig. 3 is a cross-sectional view of the assembled  
nozzle and feed line; and

Fig. 4 is a plan view of a series of my nozzles  
in operation showing the sheet-like sprays of coat-  
ing material produced by the nozzles.

The nozzle, as shown in the drawing, comprises  
primarily a block-shaped, usually oblong, member  
10, having a curved surface 11 for fitting onto the  
feed conduit, and a central opening 12 for ad-  
mitting the fluid coating from the feed line. A  
cover plate 13 is attached to the base member 10  
by means of bolts 14. In the modification shown  
these bolts extend through the member 10 and  
are threaded into the feed conduit 15 so that they  
serve the dual function of holding the nozzle  
members together and for attaching the nozzle  
to the conduit 15. By this arrangement the nozzle  
may be quickly installed for operation and just as  
easily removed and dis-assembled. As shown in  
Fig. 2 the cover plate 13, base member 10 and  
feed line 15 have corresponding holes for re-  
ceiving the bolts 14.

The central opening 12 in the base member 10  
coincides with a like opening 16 in the feed line  
15 when the nozzle is mounted thereon. Ex-  
tending from the opening 12 is a curved recess 17  
which is generally of the same shape as the  
stream of coating material that issues from this  
opening. In other words, the shape of this recess  
substantially determines the fan or fish-tail shape  
of the emitted coating. More specifically this  
recess is substantially in the shape of an arc or  
crescent having the opening 12 as a mid-point  
or center of the peripheral curvature.

The cover plate 13 is usually in the form of a  
flat piece of metal and arranged over the recess  
17 so as to prevent the coating liquid from emitting  
directly from the center opening 12 and instead  
cause it to enter the recess and finally project  
from the elongated narrow, slot-like orifice shown  
at 18. The coating material strikes the inner face  
of the cover plate 13 which causes it to spread  
out in the recess 17. Because of the shape of the  
orifice 18 and the arc-like shape of the associated

recess 17, the coating that emits from the orifice assumes a fan-like or fish-tail shape for the purposes explained above.

5 The nozzle may be mounted at any desired position or angle on the conduit 15, so that the emitted material may project upward, downward or laterally as desired. If the conduit 15 has a flat surface the surface 11 of the nozzle base will be flat also.

10 In the coating assembly shown in Fig. 4, a number of my nozzles, indicated generally at 19, are connected to the feed line 20; the coating material being propelled through the line and through the nozzles by a suitable pump indicated diagrammatically at 21. The nozzles are advantageously located in slightly staggered position to effect interlacing of the sheets of coating material along their line of junction, as shown. This arrangement provides a concentration of the coating material along the central portion of the system, forming therein a uniform, continuous flow. The object to be coated is placed in or passed through this central portion. Usually one or two passes will effect a very complete coating of the object.

25 My nozzle is adapted for flowing water or substantially any type of liquid, but is especially suitable for flowing or sheeting various coating materials such as paint, stains, varnishes, lacquers, and liquid waterproofing compositions.

30 The nozzle of my invention may be made of metal or any other suitable machineable or moldable material which is resistant to the coating compositions used. I have found hardened steel to be a desirable material. While the nozzle has been depicted primarily as having a flat more or less oblong shape it is to be understood that various other shapes and sizes may be employed, so long as the important constructional features described hereinabove are maintained.

#### I claim:

1. A nozzle for direct attachment to a coating liquid supply conduit of a coating system to be attached intermediate the ends thereof, and which is intended to provide a directed flow of the coating liquid without any substantial atomization thereof and which is characterized by its simplicity of construction which permits easy dismantling for cleaning and by elimination of ducts and all atomizing means within the nozzle, said nozzle consisting of essentially a base shaped to engage the surface of the liquid supply conduit, said base having an opening therethrough adapted to register with an opening in the liquid supply conduit, a substantially arc shaped recess formed in the upper surface of the base, in the plane of said surface, opening to one side of the base, and in continuity with said opening in the base and a cover plate of substantially similar shape to the base and located over the upper surface of said base so as to form with said recessed portion of the base a substantially fan-shaped chamber which positively excludes any admission therein of gas or other fluid that would tend to atomize the liquid coating material and from which said liquid coating material flowing from the supply conduit may be emitted in a substantially fan shaped, sheet-like unatomized form, and connecting means extending through said cover plate and base to hold them together and adapted to be connected directly to said supply conduit.

2. A nozzle as defined in claim 1 in which the base of the nozzle has only a single opening for introduction of the coating liquid from the supply conduit into the fan shaped chamber.

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