



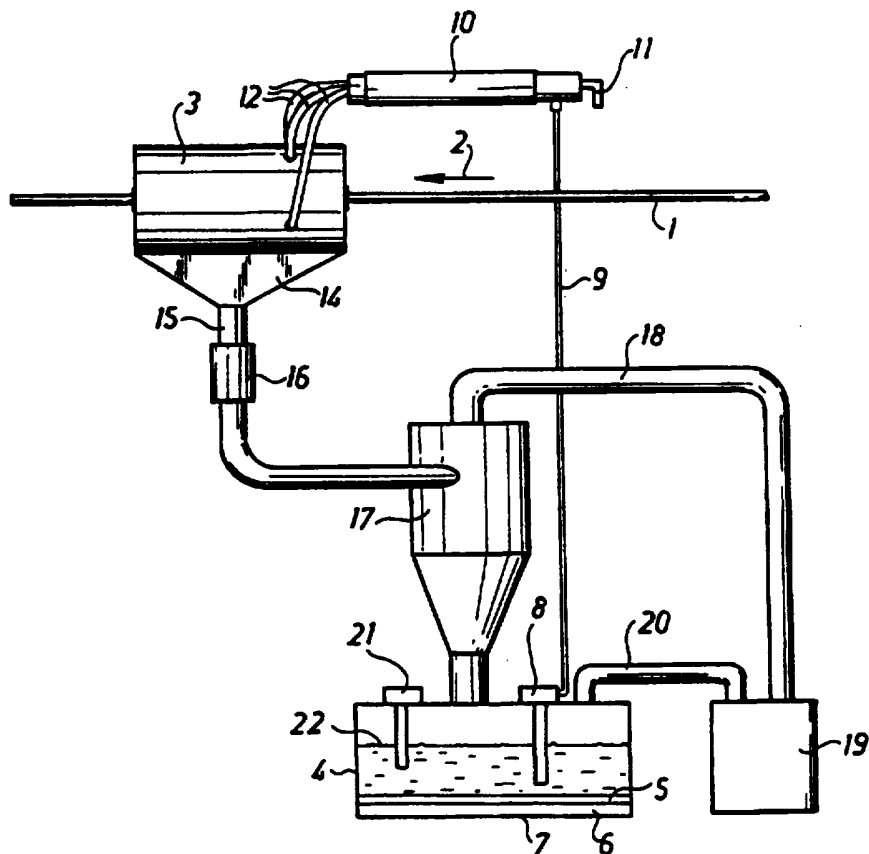
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(21) International Application Number: PCT/SE95/01327 (22) International Filing Date: 9 November 1995 (09.11.95) (30) Priority Data: 9403862-7 9 November 1994 (09.11.94) SE (71) Applicant (for all designated States except US): NORDSON SVERIGE AB [SE/SE]; P.O. Box 231, S-444 23 Stenungsund (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): SIMONSSON, Lars [SE/SE]; Lönneskogen 13, S-440 60 Skärhamn (SE). (74) Agent: AWAPATENT AB; P.O. Box 11394, S-404 28 Göteborg (SE).		(81) Designated States: AM, AT, AT (Utility model), AU, BB, BG, BR, BY, CA, CH, CN, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, ES, FI, FI (Utility model), GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, LS, MW, SD, SZ, UG). Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: A METHOD AND A DEVICE FOR APPLICATION OF POWDER ON A STRIP

(57) Abstract

The invention concerns a method and a device for application of talcum powder or a powder of super-absorbent type (SAP) or the like, the latter containing polyacrylate and/or a salt, such as a sodium salt, on a strip. In accordance with the invention the strip is made to travel through a treatment chamber (3) in which debouch a number of powder supply lines (12) distributed circumferentially with respect to said strip. The powder supply lines are incorporated in a friction charger formed with polarizing ducts through which the powder material is made to pass.



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A METHOD AND A DEVICE FOR APPLICATION OF POWDER ON A
STRIP

The subject invention concerns a method of applying talcum powder or a powder of super-absorbent type (SAP) or the like, the latter comprising polyacrylate and/or a salt, such as a sodium salt, on a strip, e.g. a power cable.

5 The main purpose of the invention is to provide a method and a device for efficient application of such powders on the strip in question.

Surprisingly, it has been found that said powders may be very efficiently applied on the strip in question, which could e.g. be a
10 power cable, on which the talcum serves as a lubricant between two insulating layers, and a primary purpose of the super-absorbent powder is to absorb liquid upon damages to the cable cover and on account of the swelling caused thereby to form a seal at the site of the rupture with the aid of a friction charger wherein polarizing ducts are
15 used through which the powder material is made to pass. In this case, the ducts emanating from the friction charger debouch into a treatment chamber through which the strip to be treated is made to pass. The mouths of the ducts into the treatment chamber are distributed circumferentially with respect to said strip in such a
20 manner that charged powder moves towards said strip from several directions simultaneously.

Further characteristics of the invention will appear from the dependent claims.

One embodiment of the invention will be described in the
25 following with reference to the accompanying drawing, wherein

Fig. 1 is a schematical view of an installation in accordance with the invention, and

Fig. 2 likewise is a schematical representation in cross-sectional view of a part of the installation, viz. through the treatment chamber
30 in which powder material is applied on a strip passing through the chamber.

In Fig. 1 numeral reference 1 is used to designate a movable strip being advanced in the direction of arrow 2. The advancement could be continuous or intermittent. In accordance with the embodiment illustrated the strip 1 is a metal conductor for a power cable.

5 Numeral reference 3 designates a treatment chamber which preferably abuts tightly against the strip 1 at its two ends, for instance with the aid of bristled through-apertures. Numeral reference 4 designates a supply container holding the powder material to be applied on the strip 1. The material in question is of talcum powder type or a super-
10 absorbent powder (SAP) or the like. The latter material contains polyacrylate and/or a salt, such as a sodium salt. The sodium salt may be a further developed form of polyacrylate. Preferably, the powder is maintained in a fluidized state inside the supply container by admission of air or other gas through a perforated inner bottom
15 wall 5. Prior to its passage through the interior bottom wall the gas is distributed via an intermediate space 6 between the interior bottom wall 5 and the outer bottom wall 7 of the container. Numeral reference 8 designates a powder pump which is connected to a friction charger 10 via a powder supply line 9. The friction charger 10, which could
20 e.g. be configured as disclosed in Applicants' U.S. Patent Specification No. 4,597,534, is formed with a connection 11 for inlet of air or other propelling gas for the purpose of forcing the powder through the charging ducts provided in the friction charger. The friction charging ducts inside the friction charger 10 communicate with mouths or
25 nozzels 13 positioned in the treatment chamber 3, by way of prolongation lines 12. The ducts inside the friction charger 10 are polarized in such a manner that they impart the desired charge to the powder material passing through the charger. When the powder is a talcum powder, the ducts preferably consist of polytetrafluoro-
30 ethylene, otherwise they preferably are of nylon, but also other materials providing a negative charge, such as e.g. polyethylene plastic, are conceivable in the latter case as also other materials which like tetrafluoroethylene give a positive charge with respect to talcum. The lower part of the treatment chamber 3 is structured as a
35 collection funnel 14 the bottom part of which is connected to a return line 15 which by way a propelling device 16, for instance an ejector, is in communication with a separator 17, for instance cyclone filter. The

separator 17 opens into the storage container 4 and also communicates with an outlet line 18 leading to the exterior by way of a filtering device 19. In addition, the supply container is connected to the filtering device 19 by way of a venting line 20. Numeral reference 21
5 designates a level controller by means of which the desired level 22 of the material is maintained inside the storage container. Devices for replenishing of new powder material are also connected to the container. These devices are not, however, illustrated in the drawing. Preferably, the friction ducts of charger 10 are grounded as is also
10 strip 1.

The illustrated device functions in the following manner. The powder material fluidized inside the storage container 4 is fed by the pump 8 and via the interconnection line 9 to the friction charger 10, wherein the powder material is imparted a negative charge through
15 friction against the elongate ducts therein. The powder material exiting from the ducts mouths 13 is attracted to the strip 1 and remain thereon, also after the strip having passed through the treatment chamber 3. Superfluous powder material is conducted via line 15 through an accelerating ejector 16 at a high velocity into the
20 separator 17, which in the embodiment illustrated is constructed as a cyclone filter. In other words, the powder material is imparted a swirling movement inside the cyclone, whereby the powder material slides downwards along the external wall of the cyclone separator into the storage container for recirculation via the connection line 9, the
25 friction charger 10 and so on.

The invention has been described in the foregoing by way of one example according to which the interior threads of a power line are coated with the referred-to liquid-absorbent powder material prior to the application of a further insulating layer. However, it is likewise
30 possible to use the invention in other contexts involving application of the powder material in question. In case the strip in question is not conductive, grounding may still be effected by guiding the strip by or supporting it on carriers that in turn are conductive. Talcum preferably is applied between two sandwiching insulating layers in
35 order to facilitate peeling of the outer layer from an interior layer. In this case, the talcum serves as a lubricant. The cyclone may be omitted.

The chemical composition of talcum is $\text{Mg}_3(\text{OH})_2 \text{Si}_4\text{O}_{10}$, and examples of compositions that have proved to be particularly suitable are:

5	<u>I</u>		
	SiO_2	59	%
	MgO	31.50	%
	Fe_2O_3	1.10	%
10	Al_2O_3	1.90	%
	CaO	0.60	%
	pH-value	9.30	%
	<u>II</u>		
15	SiO_2	52	%
	MgO	30.80	%
	Fe_2O_3	2.80	%
	CaO	0.90	%
20	Al_2O_3	5.40	%
	Na_2O	0.05	%
	K_3O	0.10	%
	TiO_2	0.30	%
	$\text{H}_2\text{O} + \text{CO}_2 (1050^\circ\text{C})$	8	%
25	pH-value, DIN 53200	8.50	%

Although test have shown that these compositions are very efficient, the composition may naturally be changed without departure from the inventive idea.

CLAIMS

- 5 1. A method of applying talcum powder or a powder of super-absorbent type (SAP) or the like, the latter containing polyacrylate and/or a salt, such as a sodium salt, on a strip, e.g. on a power cable, c h a r a c t e r i z e d by bringing the strip (1) to travel through a treatment chamber (3) in which debouch a number of powder supply
10 lines (12) distributed circumferentially with respect to said strip, said powder being introduced into said chamber by way a friction charger (10) formed with polarizing ducts through which the powder material is made to pass.
2. A method as claimed in claim 1, c h a r a c t e r i z e d in
15 that the strip as well as the ducts in the friction charger (10) are electrically grounded.
3. A method as claimed in claim 1 or 2, the powder being a super-absorbent powder (SAP) or the like, containing polyacrylate and/or a salt, such as e.g. a sodium salt, c h a r a c t e r i z e d in
20 that the ducts are chosen to be negatively polarizing.
4. A method as claimed in claim 2 or 3, c h a r a c t e r i z e d in that a nylon material or a polyethylene material is chosen for the ducts in the friction charger (10).
5. A method as claimed in claim 1 or 2, the powder being
25 talcum, c h a r a c t e r i z e d in that the ducts are chosen to be positively polarizing.
6. A method as claimed in claim 5, c h a r a c t e r i z e d in that polytetrafluoroethylene is chosen for the ducts of the friction charger (10).
- 30 7. A device for applying talcum powder or a powder of super-absorbant type (SAP) or the like, the latter containing polyacrylate and/or a salt, such as a sodium salt, on a strip (1), such as a power cable, c h a r a c t e r i z e d in that is consists of a treatment chamber (3) through which the strip (1) may be conveyed and powder
35 supply ducts which debouch into the chamber distributed circumferentially with respect to the strip, said powder supply ducts incorporating a friction charger (10) having polarizing ducts.

8. A device as claimed in claim 7, characterized in that the strip as well as the ducts in the friction charger are electrically grounded.

5 9. A device as claimed in claim 7 or 8, the powder being a super-absorbent powder or the like, containing polyacrylate and/or a salt, such as a sodium salt, characterized in that the ducts are negatively polarized.

10 10. A device as claimed in claim 9, characterized in that the ducts in the friction charger (10) consist of nylon or polyethylene material.

11. A device as claimed in claim 7 or 8, the powder being talcum, characterized in that the ducts in the friction charger (10) are positively polarizing.

15 12. A device as claimed in claim 11, characterized in that the ducts of the friction charger (10) consist of polytetrafluoroethylene.

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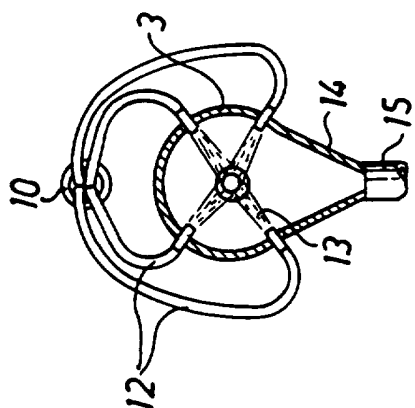


Fig. 2

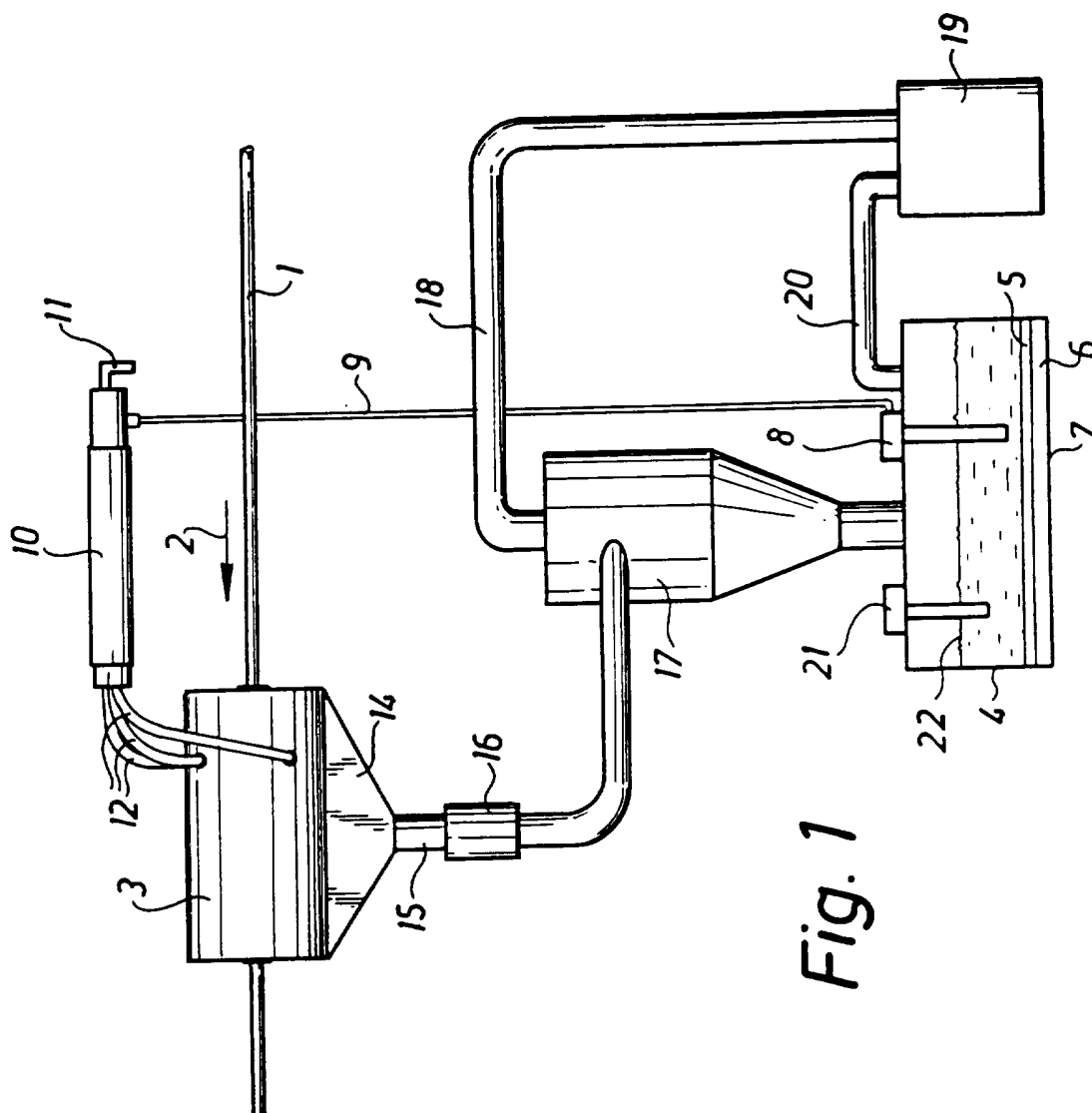


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 95/01327

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B05B 5/14, B05D 7/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 1535612 A (CANADA WIRE AND CABLE LIMITED), 13 December 1978 (13.12.78), figure 1, claims 1,18 --	1,10
A	US 4597534 A (JAN RUUD), 1 July 1986 (01.07.86), abstract -- -----	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		DE-A,B,B 2704755	11/08/77
		FR-A,B- 2340140	02/09/77
		JP-C- 1023505	28/11/80
		JP-A- 52115844	28/09/77
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		SE-A- 8102606	25/10/82
		WO-A- 8203573	28/10/82