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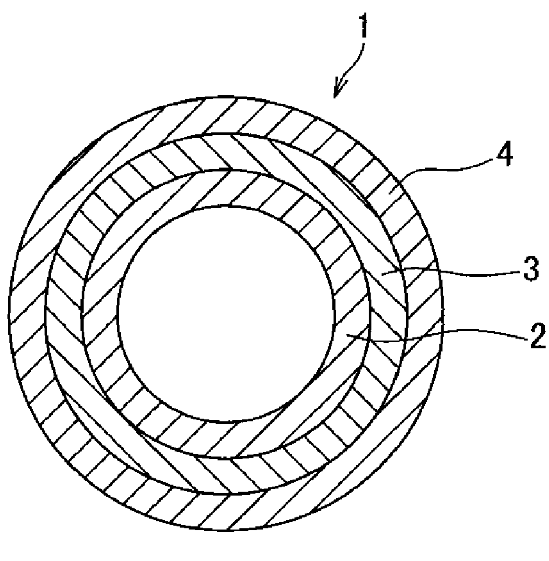
(54) PHOTOCONDUCTIVE DRUM, IMAGE FORMING APPARATUS, AND METHOD OF REGENERATING PHOTOCONDUCTIVE DRUM

(57) A photoconductive drum (1) includes a sleeve member (2) having a hollow cylindrical shape, a photosensitive layer (3), and a protective layer (4). The photosensitive layer (3) and the protective layer (4) are sequentially laminated on an outer peripheral surface of the sleeve member (2). A surface of the protective layer (4) has an arithmetic mean roughness (Ra) of less than 0.03 μm at a cutoff value of 0.25 mm and an arithmetic mean waviness (Wa) of 0.05 μm or more at the cutoff value of 2.5 mm.

FIG. 1



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Description

BACKGROUND

Technical Field

[0001] Aspects of the present disclosure relate to a photoconductive drum, an image forming apparatus, and a method of regenerating photoconductive drum.

Related Art

[0002] In general, in an image forming apparatus, an electrostatic latent image is formed on a photoconductive drum by an optical writing device and developed as a toner image by a developing device, and the toner image is transferred to a transfer belt. Residual toner on a surface of the photoconductive drum is removed by a cleaning device. When the formation of the toner image and the removal of the toner as described above are repeated, the surface of the photoconductive drum may be damaged.

[0003] Therefore, there has been proposed a photoconductive drum recycling apparatus for polishing the surface of the photoconductive drum to recycle the photoconductive drum (see, for example, JP-3854171-B1 (JP-2002-351098-A)). In the photoconductive drum recycling apparatus described in JP-3854171-B1 (JP-2002-351098-A), the surface roughness Rmax of the photoconductive drum after polishing is set to 4.5 μm or less, thereby removing adhered materials on the surface of the photoconductive drum.

[0004] However, it has been desired that the characteristics of the photoconductive drum after polishing may be further improved since simply polishing the photoconductive drum to reduce its surface roughness may not obtain the same characteristics as an unused photoconductive drum.

SUMMARY

[0005] A purpose of the present invention is to provide a photoconductive drum capable of obtaining good characteristics even after polishing, an image forming apparatus including the photoconductive drum, and a method of regenerating the photoconductive drum.

[0006] In an aspect of the present disclosure, there is provided a photoconductive drum that includes a sleeve member having a hollow cylindrical shape, a photosensitive layer, and a protective layer. The photosensitive layer and the protective layer are sequentially laminated on an outer peripheral surface of the sleeve member. A surface of the protective layer has an arithmetic mean roughness of less than 0.03 μm at a cutoff value of 0.25 mm and an arithmetic mean waviness of 0.05 μm or more at the cutoff value of 2.5 mm.

[0007] In another aspect of the present disclosure, there is provided a method of regenerating the photoconductive drum by applying a polishing process to the photoconductive drum after use. The method includes polishing, in the polishing process, the surface of the protective layer with polishing means including agglomerative abrasive grains as polishing abrasive grains.

[0008] According to the present invention, the photoconductive drum has an arithmetic average roughness less than 0.03 μm, thus allowing the influence of scratches to be reduced by polishing even if the surface of the photoconductive drum is scratched by using the photoconductive drum. Therefore, the photoconductive drum can restrain a cleaning failure caused by scratches of the surface of the photoconductive drum when a cleaning blade cleans the surface of the photoconductive drum and can also restrain a streak-like stain caused by the scratches when an image is formed. Moreover, setting the arithmetic average waviness to be 0.05 μm or more can ensure a sufficient cleaning performance, and restrain uneven contact of the cleaning blade and the photoconductive drum. Thus, even after polishing, sufficient surface characteristics of the photoconductive drum can be obtained by reducing the surface roughness at relatively micro level and retaining the surface waviness at relatively macro level.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The aforementioned and other aspects, features, and advantages of the present disclosure would be better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

FIG. 1 is a cross-sectional view illustrating a photoconductive drum according to an embodiment of the present invention;
FIG. 2 is a cross-sectional view illustrating a surface state of the unused photoconductive drum;

FIG. 3 is a cross-sectional view illustrating a surface state of the photoconductive drum after use;
FIGS. 4A and 4B are perspective views illustrating a polishing apparatus that polishes the photoconductive drum;
FIG. 5 is a cross-sectional view illustrating a surface state of the photoconductive drum having been polished by a polishing means with free abrasive grains;
FIG. 6 is a cross-sectional view illustrating a surface state of the photoconductive drum having been polished by a polishing means having fixed abrasive grains;
FIG. 7 is a graph illustrating a relationship between a primary particle diameter and an average polishing rate when a surface of the photoconductive drum is polished by the polishing means having agglomerative abrasive grains;
FIG. 8 is a graph illustrating arithmetic mean waviness Wa of the photoconductive drum before and after polishing; and
FIG. 9 is a graph illustrating electrostatic capacitance of the photoconductive drum before and after polishing.

[0010] The accompanying drawings are intended to depict embodiments of the present disclosure and should not be interpreted to limit the scope thereof. The accompanying drawings are not to be considered as drawn to scale unless explicitly noted.

DETAILED DESCRIPTION

[0011] In describing embodiments illustrated in the drawings, specific terminology is employed for the sake of clarity. However, the disclosure of this patent specification is not intended to be limited to the specific terminology so selected and it is to be understood that each specific element includes all technical equivalents that operate in a similar manner and achieve similar results.

[0012] Although the embodiments are described with technical limitations with reference to the attached drawings, such description is not intended to limit the scope of the disclosure and all of the components or elements described in the embodiments of this disclosure are not necessarily indispensable.

[0013] Referring now to the drawings, embodiments of the present disclosure are described below. In the drawings for explaining the following embodiments, the same reference codes are allocated to elements (members or components) having the same function or shape and redundant descriptions thereof are omitted below.

[0014] Embodiments of the present invention will be described in accordance with the drawings. As illustrated in FIG. 1, the photoconductive drum 1 of the present embodiment includes a hollow cylindrical sleeve member 2, a photosensitive layer 3 laminated on an outer peripheral surface of the sleeve member 2, and a protective layer 4 laminated on an outer peripheral surface of the photosensitive layer 3. Namely, the photosensitive layer 3 and the protective layer 4 are sequentially laminated on the outer peripheral surface of the sleeve member 2. The photoconductive drum 1 is used in an image forming apparatus such as a copying machine, a facsimile, a laser printer, a multifunctional machine having two or more of the foregoing capabilities, and the like. An electrostatic latent image is formed on the surface by an optical writing device and developed by a developing device as a toner image, and the toner image is transferred to a transfer belt.

[0015] The photosensitive layer 3 includes, for example, an undercoating layer, a charge generating layer, and a charge transport layer. The protective layer 4 is formed by, for example, dispersing a filler such as a resin or the like in a binder resin such as polycarbonate which constitutes the charge transport layer. The configurations and materials of the photosensitive layer 3 and the protective layer 4 may be suitably selected.

[0016] FIG. 2 schematically illustrates a surface shape of the protective layer 4 in the unused (new) photoconductive drum 1. FIG. 3 schematically illustrates the surface shape of the protective layer 4 in the photoconductive drum 1 after a predetermined number of uses.

[0017] As enlarged illustrated in FIGS. 2 and 3 (see the inside of each dashed line circle), as the photoconductive drum 1 is used, rough surface degradation is caused by abrasion and filming. Furthermore, as the photoconductive drum 1 is used uneven contact of the cleaning blade and the photoconductive drum 1 or a developing material causes scratches 41 to 43. Also, the protective layer 4 has a waviness shape both before and after the use of the photoconductive drum 1.

[0018] The photoconductive drum 1, which has degraded through use, is polished as described below to regenerate the photoconductive drum 1.

[0019] FIG. 4 illustrates a polishing apparatus 100 (polishing means) that polishes the photoconductive drum 1. The polishing apparatus 100 has a cylindrical elastic member 101 and a polishing film 102 attached to the upper surface of the elastic member 101. The polishing apparatus 100 is configured to be rotated by a power source with the height direction of the cylindrical elastic member 101 as the axial direction of the polishing apparatus 100.

[0020] The elastic member 101 is made of, for example, urethane foam, foamed EVA sponge, suede, nonwoven fabric, or the like.

[0021] The polishing film 102 has agglomerative abrasive grains as abrasive grains, and functions as a polishing means. The agglomerative abrasive grains are agglomerates consisting of a large number of fine primary particles. A large number of primary particles are loosely coupled to each other, partially and with void areas formed, to form a granular porous body.

[0022] To obtain such agglomerative abrasive grains, granules (secondary particles) having a particle size of about 1 μm to about 300 μm are obtained by granulating with a spray dryer. Thereafter, the granules are heat treated to form a porous structure. The agglomerative abrasive grains after heat treatment preferably have a compressive breaking strength of 20 megapascals (MPa) or less. If the compressive breaking strength is too high, scratches are likely to occur during polishing.

[0023] The primary particles of the agglomerative abrasive grains preferably have an average particle diameter of 4 μm or less. The primary particles are preferably inorganic oxide such as aluminum oxide, zirconium oxide, silicon dioxide, cerium oxide, silicon dioxide, iron oxide, or the like.

[0024] Next, the abrasive grains obtained as described above are mixed with liquid urethane resin, and methyl ethyl ketone is added as a solvent to adjust a viscosity of the solution. The solution is mixed and stirred for about 10 minutes using a stirrer to prepare a mixture. Stirring is carried out at room temperature, and the number of revolutions can be set to 100 round per minutes (rpm) as a degree that does not destroy abrasive grains. The mixture is coated with a wire bar coater on a substrate (e.g., polyethylene terephthalate (PET) film having a thickness of about 75 μm), and then dried for an hour in a constant temperature chamber kept at 60°C, and the polishing film 102 can be obtained.

[0025] A polishing process is carried out by rotating the photoconductive drum 1 by a power source and rotating the polishing apparatus 100 by the power source and reciprocating the polishing apparatus 100 in the vertical direction in the FIG. 4B. At this time, the polishing film 102 rotates with the elastic member 101 in the state of biting into the surface of the photoconductive drum 1 by a certain amount.

[0026] The polishing apparatus 100 as described above performs the polishing process on the photoconductive drum 1 whose surface of the protective layer 4 has degraded after a certain number of uses, thus, allowing a regenerated photoconductive drum 1 to be obtained. The regenerated photoconductive drum 1 has an arithmetic mean roughness Ra defined in JIS B 0601-2001 being less than 0.03 μm at a cutoff value of 0.25 mm, an arithmetic mean waviness Wa defined in JIS B 0601-2001 being 0.05 μm or more at the cutoff value of 2.5 mm, and a maximum height roughness Rz defined in JIS B 0601-2001 being 0.5 μm or less at the cutoff value of 0.25 mm, on the surface of the protective layer 4. Furthermore, the average thickness of the protective layer 4 is 0.2 μm or more in the regenerated photoconductive drum 1.

[0027] According to the present embodiment, the following effects can be obtained. With the configuration in which the arithmetic average roughness Ra on the surface of the protective layer 4 is less than 0.03 μm, even if the scratches 41 to 43 are formed on the photoconductive drum 1, the influence of the scratches 41 to 43 can be reduced by polishing. Therefore, when the cleaning blade cleans the surface of the photoconductive drum 1, a cleaning failure caused by scratches of the surface of the photoconductive drum 1 can be restrained. Further, when an image is formed, a streak-like stain caused by the scratches can be restrained.

[0028] Moreover, setting the arithmetic average waviness Wa of 0.05 μm or more on the surface of the protective layer 4 can ensure a sufficient cleaning performance of the cleaning blade and restrain uneven contact of the cleaning blade and the photoconductive drum 1. Thus, sufficient surface characteristics of the photoconductive drum 1 can be obtained even if after polishing, by reducing the surface roughness at relatively micro level and retaining the surface waviness at relatively macro level.

[0029] Moreover, setting the maximum height roughness Rz on the surface of the protective layer 4 to be 0.5 μm or less can prevent polishing from causing new scratches.

[0030] Moreover, setting the average thickness of the protective layer 4 to 0.2 μm or more can restrain a change in the electrostatic properties of the photosensitive layer 3 and extend the use life of the regenerated photoconductive drum 1.

[0031] By polishing the surface of the protective layer 4 using the polishing film 102 with the agglomerative abrasive grains, the arithmetic mean roughness Ra on the surface of the protective layer 4 after polishing can be less than 0.03 μm, while the arithmetic average waviness Wa is 0.05 μm or more.

[0032] On the other hand, when a polishing process with loose abrasive grains (e.g., a soft polishing pad such as a nonwoven cloth or sponge) is used, as illustrated in FIG. 5 (a surface S0 before polishing is indicated by a solid line, a surface S1 after polishing is indicated by a broken line), the waviness can be maintained and the reduction of the arithmetic mean waviness Wa can be suppressed. However, the scratches 41 to 43 also progress with the progress of polishing, and deeper ones of the scratches 41 to 43 may not be removed.

[0033] Further, when polishing is performed using a polishing means (e.g., lapping film) with fixed abrasive grains, as illustrated in FIG. 6, the scratches 41 to 43 can be easily removed. However, the waviness cannot be maintained, and the arithmetic mean waviness Wa is reduced.

[0034] Namely, polishing with the polishing film 102 having agglomerative abrasive grains as in the present embodiment can maintain the waviness while removing the scratches 41 to 43.

[0035] Moreover, using agglomerative abrasive grains with an average particle diameter of the primary particles of 4 μm or less can prevent scratches by polishing on the surface of the protective layer 4 which is a processed surface. On the other hand, if the average particle diameter of the primary particles is too large, the polishing processing efficiency may be enhanced. However, scratches are likely to occur on the processed surface, and the quality may deteriorate.

[0036] Moreover, by using the agglomerative abrasive grains having the compressive breaking strength of 20 MPa or less, the abrasive grains wear can be gradually progressed during polishing, new cutting edges can easily be generated, the quality can be improved while the surface of the protective layer 4 is polished, and such a condition can be easily maintained for a long time. On the other hand, if the compressive breaking strength of the agglomerative abrasive grains is too high, new polishing scratches may occur on the surface of the protective layer 4 during polishing, which may lead to deterioration of the quality of the surface.

[0037] Also, by using agglomerative abrasive grains in which the primary particles are made of inorganic oxide, stains and scratches on the surface of the protective layer 4 can be easily removed.

[0038] The present disclosure is not limited to the example embodiments described above and various modifications are available as described below.

[0039] For example, in the above-described embodiment, the maximum height roughness Rz at the surface of the protective layer 4 is 0.5 μm or less at the cutoff value of 0.25 mm. However, the maximum height roughness Rz may be larger than 0.5 μm if the arithmetic average roughness Ra can be less than 0.03 μm at the cutoff value of 0.25 mm.

[0040] Further, in the above-described embodiment, the average thickness of the protective layer 4 is 0.2 μm or more. However, for example, if it is desired to improve the initial image quality, the average thickness of the protective layer 4 may be less than 0.2 μm.

[0041] Moreover, in the above-described embodiment, as the agglomerative abrasive grains, the average particle diameter of the primary particles is 4 μm or less, the compressive breaking strength is 20 MPa or less, and the primary particles are made of inorganic oxide. However, the polishing means need only have agglomerative abrasive grains that can maintain the waviness shape while removing scratches on the surface of the protective layer 4, and the average particle diameter of the primary particles, the compressive breaking strength, and the material of the primary particles may be selected as appropriate.

[0042] Other configurations, methods, etc. for implementing the present invention are disclosed in the above descriptions. However, the present invention is not limited to the above-described configurations and methods. That is to say, the present invention is mainly illustrated and described with respect to particular embodiments in the above descriptions. However, various modifications can be made without departing from the scope of the technical idea and purpose of the present invention.

[0043] Therefore, the descriptions of limiting the shape, the material, and the like disclosed above is illustrated to facilitate the understanding of the present invention, and do not limit the present invention. Descriptions with the name of the members removed some or all of the limitations of shapes and materials are included in the present invention.

Examples

Surface State Before and After Polishing

[0044] Using an polishing film having the average particle diameter of the primary particles of 3 μm and the compressive breaking strength of 7.7 MPa, the unused photoconductive drum 1 and the photoconductive drum 1 after use were polished, and the arithmetic mean roughness Ra and the maximum height roughness Rz before and after polishing were measured. Form Talysurf S4C manufactured by AMETEK Inc. (formerly Taylor Hobson Ltd.) was used for the measurements. The surface of the photoconductive drum 1 was measured at four locations (at 90-degree intervals) in the circumferential direction of the photoconductive drum 1. The results are illustrated in Table 1.

Table 1

Photoconductive Drum Surface State		Arithmetic Average Roughness Ra (μm)	Maximum Height Roughness Rz (μm)
Before Use	Before Polishing	0.03 to 0.0367	0.15 to 0.17
	After Polishing	0.0176 to 0.0271	0.1596 to 0.2407
After Use	Before Polishing	0.043 to 0.0717	0.3 to 0.4
	After Polishing	0.0155 to 0.0264	0.1415 to 0.225

[0045] As the photoconductive drum 1 is used, both the arithmetic mean roughness Ra and the maximum height roughness Rz were increased. Also, the arithmetic average roughness Ra was reduced by polishing in both the unused photoconductive drum 1 and the photoconductive drum 1 after use. The maximum height of the unused photoconductive drum 1 was slightly increased after polishing. The maximum height roughness Rz was decreased by polishing the photoconductive drum 1 after use, but became a larger value than the maximum height roughness Rz of the unused photoconductive drum 1 before polishing.

Polishing Method Type and Polishing Result

[0046] The surface of the photoconductive drum 1 after use was polished using the polishing means of Examples 1 to 5 and Comparative Examples 1 to 3 illustrated in Table 2.

Table 2

	Polishing Method Type	Average Particle Diameter (μm)	Compressive Breaking Strength (MPa)
Example 1	Agglomerative Abrasive Grains	0.1	2.2
Example 2	Agglomerative Abrasive Grains	2	5.1
Example 3	Agglomerative Abrasive Grains	3	7.1
Example 4	Agglomerative Abrasive Grains	3	19.3
Example 5	Agglomerative Abrasive Grains	3	22.3
Example 6	Agglomerative Abrasive Grains	4	8.2
Comparative Example 1	Ultraprecision Lapping Film	n/a	n/a
Comparative Example 2	Ultraprecision Lapping Film	n/a	n/a
Comparative Example 3	Alumina Slurry Polishing Pad	n/a	n/a

[0047] The ultraprecision lapping film of Comparative Example 1 is a LAPIKA #1200 film manufactured by KOVAX Corporation. The ultraprecision lapping film of Comparative Example 2 is a LAPIKA #10000 film manufactured by KOVAX Corporation and is finer in particle size than Comparative Example 1. The polishing pad of Comparative Example 3 is a suede type SURFIN 018-3 manufactured by FUJIMI Inc., and the alumina slurry is obtained by mixing the abrasive grains of an average particle diameter of 0.5 μm, which are manufactured by FUJIMI Inc., with water so that the abrasive grains have a weight ratio of 5 wt%. In Comparative Example 3, the alumina slurry was supplied at a feed speed of 20 cc/min on the polishing pad during polishing.

[0048] Table 3 illustrates the results of polishing using the polishing means of Examples 1 to 5 and Comparative Examples 1 to 3.

Table 3

<table>
<tr><th></th><th>Scratch Occurrence After Polishing</th><th>Scratch Removability</th></tr>
<tr><td>Example 1</td><td rowspan="4">Not Occur</td><td rowspan="6">Good</td></tr>
<tr><td>Example 2</td></tr>
<tr><td>Example 3</td></tr>
<tr><td>Example 4</td></tr>
<tr><td>Example 5</td><td>Almost Not Occur</td></tr>
<tr><td>Example 6</td><td>Almost Not Occur</td></tr>
<tr><td>Comparative Example 1</td><td>Occur</td><td>n/a</td></tr>
<tr><td>Comparative Example 2</td><td>n/a</td><td>Bad</td></tr>
</table>

(continued)

	Scratch Occurrence After Polishing	Scratch Removability
Comparative Example 3	n/a	Bad

[0049] In any of Examples 1 to 6, new scratches caused by polishing were restrained. In particular, in Examples 1 to 4, the occurrence of new scratches by polishing was restrained. In Comparative Example 1, new scratches caused by polishing occurred. The occurrence of new scratches was visually evaluated.

[0050] In any of Examples 1 to 6, the scratches were removed by using the photoconductive drum 1. In both Comparative Examples 2 and 3, the scratches caused by using the photoconductive drum 1 were not removed.

[0051] In other words, both the restraint of the occurrence of new scratches caused by polishing the removal of the scratches caused by using the photoconductive drum 1 were simultaneously achieved in any of Examples 1 to 6, while were not simultaneously achieved in any of Comparative Examples 1 to 3. In any of Examples 1 to 6, the arithmetic average roughness Ra becomes less than 0.03 μm at the cutoff value of 0.25 mm, and the arithmetic mean waviness Wa is 0.05 μm or more at the cutoff value of 2.5 mm.

[0052] Table 4 illustrates the maximum height roughness Rz when an unused photoconductive drum 1 is polished by using the polishing means of Examples 1 to 6.

Table 4

	Maximum Height Roughness Rz (μm)
Example 1	0.25 to 0.35
Example 2	0.33 to 0.48
Example 3	0.25 to 0.35
Example 4	0.33 to 0.48
Example 5	0.6 to 0.11
Example 6	0.8 to 1.5

[0053] The following tendencies were observed, that is, the larger the average particle diameter of the primary particles, the larger the maximum height roughness Rz, and the larger the compressive breaking strength, the larger the maximum height roughness Rz.

Average Particle Diameter and Polishing Efficiency

[0054] The average polishing speed (polishing efficiency) was evaluated by using a polishing means in which the compression breaking strength was substantially constant (8 MPa) and the average particle diameter of primary particles was different. Results of the tests are illustrated in FIG. 7. The larger the average particle diameter of the primary particles, the higher the polishing efficiency, and preferable polishing efficiencies were obtained when the average particle diameter was 3 μm or more.

Change of Arithmetic Mean Waviness by Polishing

[0055] Polishing was performed using the polishing means of Example 3 for the photoconductive drum 1 after use, and the arithmetic mean waviness Wa before and after polishing (before and after regenerating) was measured. Results of the measurements are illustrated in FIG. 8. In all samples, the arithmetic mean waviness Wa was decreased by polishing, but was 0.05 μm or more even after polishing.

Thickness of Protective Layer after Polishing

[0056] The used photoconductive drum 1 was polished by using the polishing means of Example 3, so that the average thickness of the protective layer 4 was 0.2 μm. The photoconductive drum 1 after polishing was installed in the image forming apparatus and a life test was performed, and good results were obtained.

Change of Electrostatic Capacitance by Polishing

[0057] The used photoconductive drum 1 was polished using the polishing means of Example 3, and the electrostatic capacity of the surface of the photoconductive drum 1 was measured before and after polishing. Results of the tests are illustrated in FIG. 9. Although the electrostatic capacitance was reduced by polishing, there was no change that affected the quality.

[0058] Numerous additional modifications and variations are possible in light of the above teachings. It is therefore to be understood that, within the scope of the above teachings, the present disclosure may be practiced otherwise than as specifically described herein. With some embodiments having thus been described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the scope of the present disclosure and appended claims, and all such modifications are intended to be included within the scope of the present disclosure and appended claims.

Claims

1. A photoconductive drum (1) comprising:

a sleeve member (2) having a hollow cylindrical shape;
a photosensitive layer (3); and
a protective layer (4),
wherein the photosensitive layer (3) and the protective layer (4) are sequentially laminated on an outer peripheral surface of the sleeve member (2),
wherein a surface of the protective layer (4) has an arithmetic mean roughness (Ra) of less than 0.03 μm at a cutoff value of 0.25 mm and an arithmetic mean waviness (Wa) of 0.05 μm or more at the cutoff value of 2.5 mm.

2. The photoconductive drum (1) according to claim 1,
wherein the surface of the protective layer (4) has a maximum height roughness (Rz) of 0.5 μm or less at the cutoff value of 0.25 mm.

3. The photoconductive drum (1) according to claim 1 or 2,
wherein an average thickness of the protective layer (4) is 0.2 μm or more.

4. An image forming apparatus comprising the photoconductive drum (1) according to any of claims 1 to 3.

5. A method of regenerating the photoconductive drum (1) according to any of claims 1 to 3 by applying a polishing process to the photoconductive drum (1) after use, the method comprising:
polishing, in the polishing process, the surface of the protective layer (4) with polishing means including agglomerative abrasive grains as polishing abrasive grains.

6. The method according to claim 5,
wherein the agglomerative abrasive grains include primary particles having an average particle diameter of 4 μm or less and have a compressive breaking strength of 20 megapascals (MPa) or less.

7. The method according to claim 5 or 6,
wherein the agglomerative abrasive grains include primary particles made of inorganic oxide.

FIG. 1

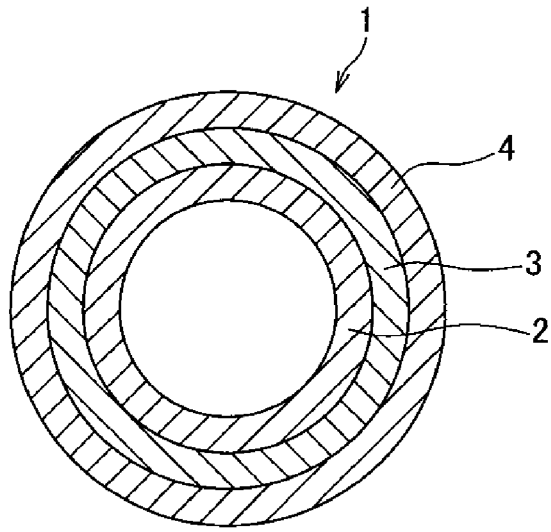


FIG. 2

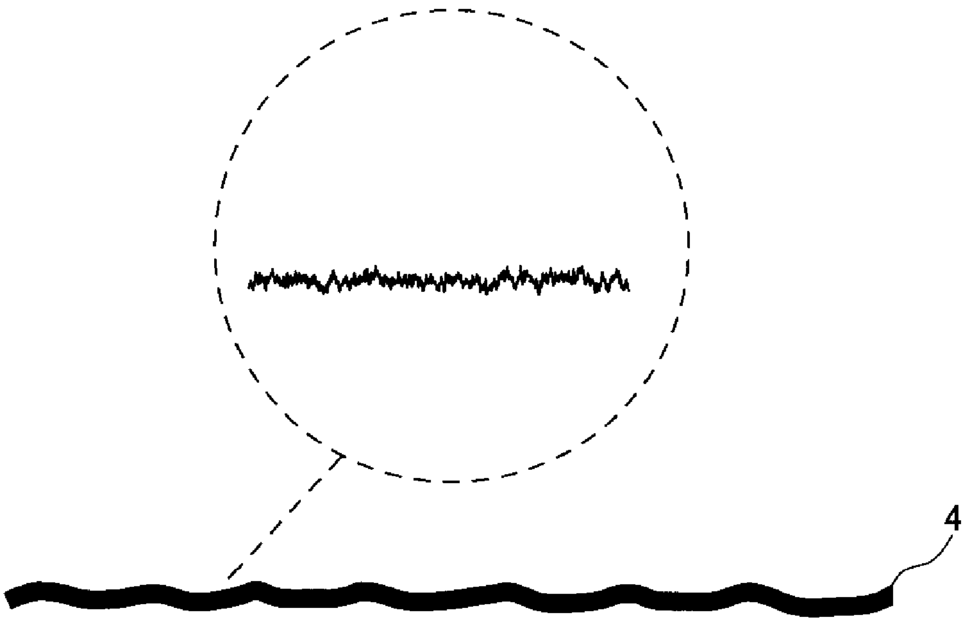


FIG. 3

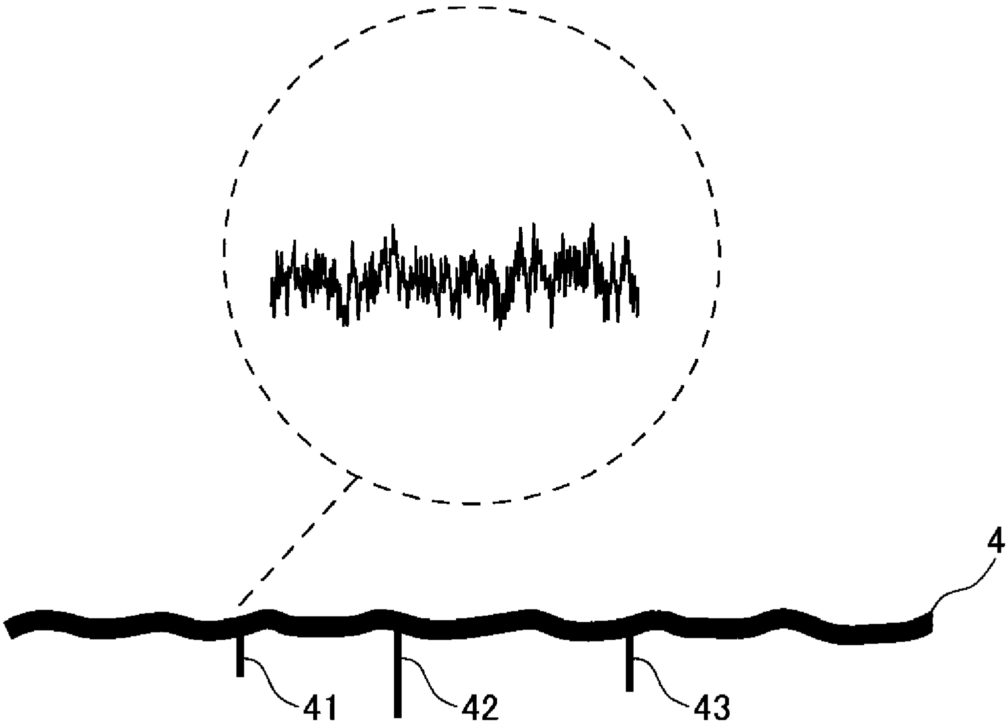


FIG. 4A

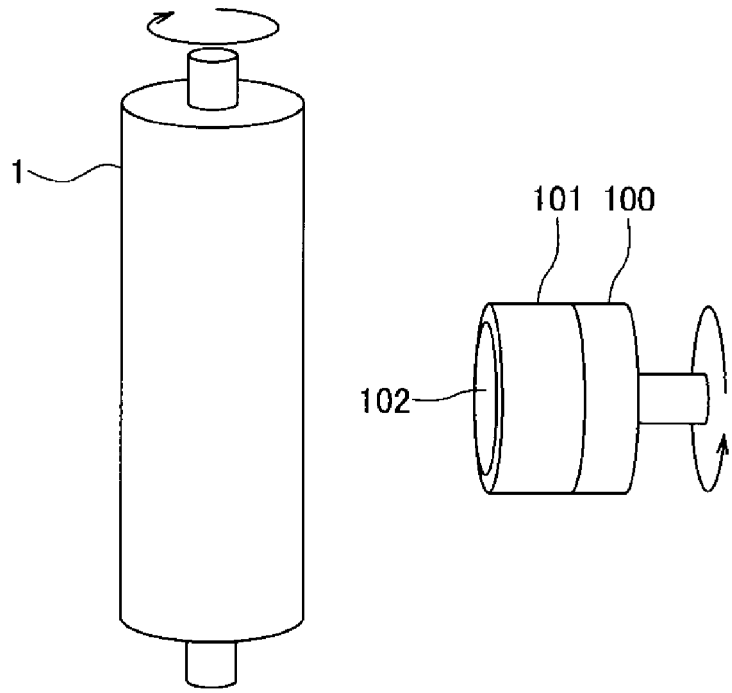


FIG. 4B

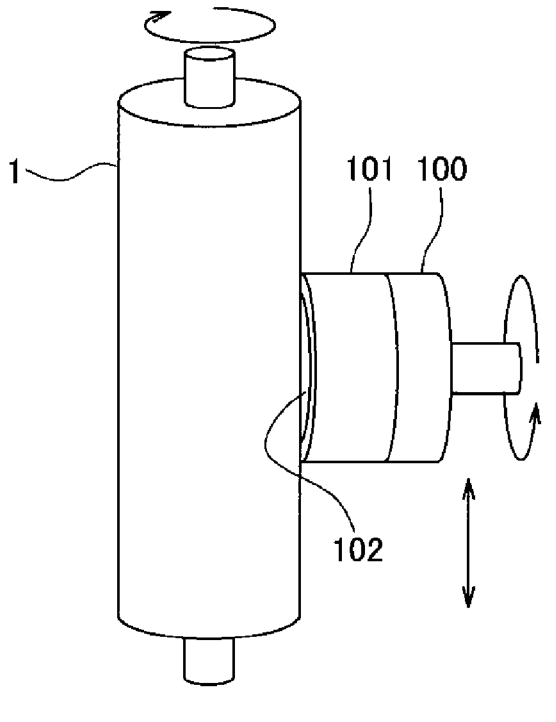


FIG. 5

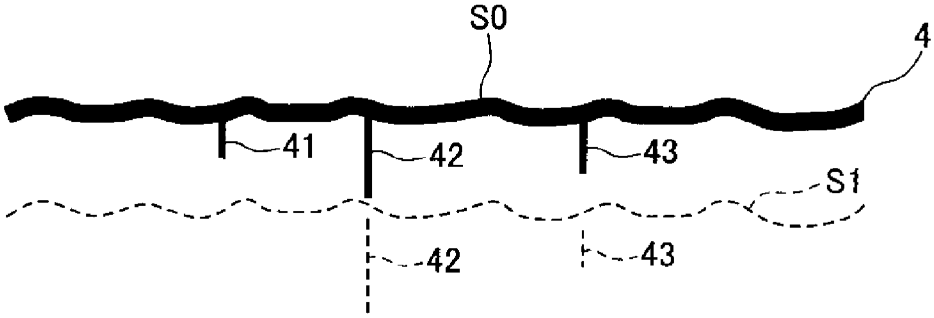


FIG. 6

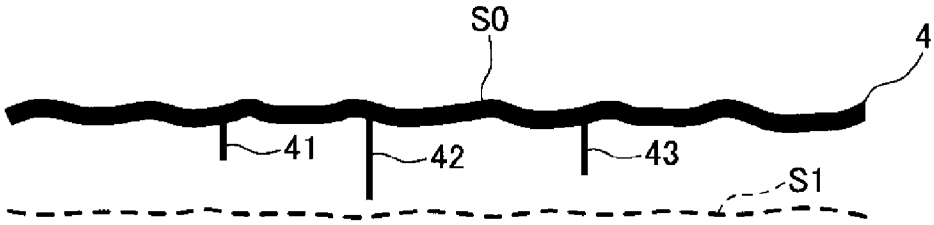


FIG. 7

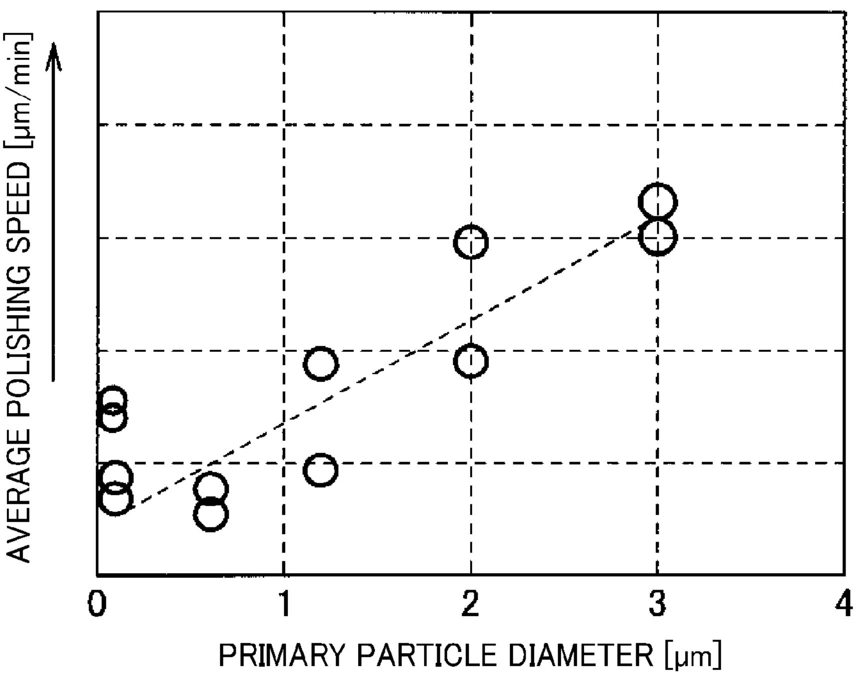


FIG. 8

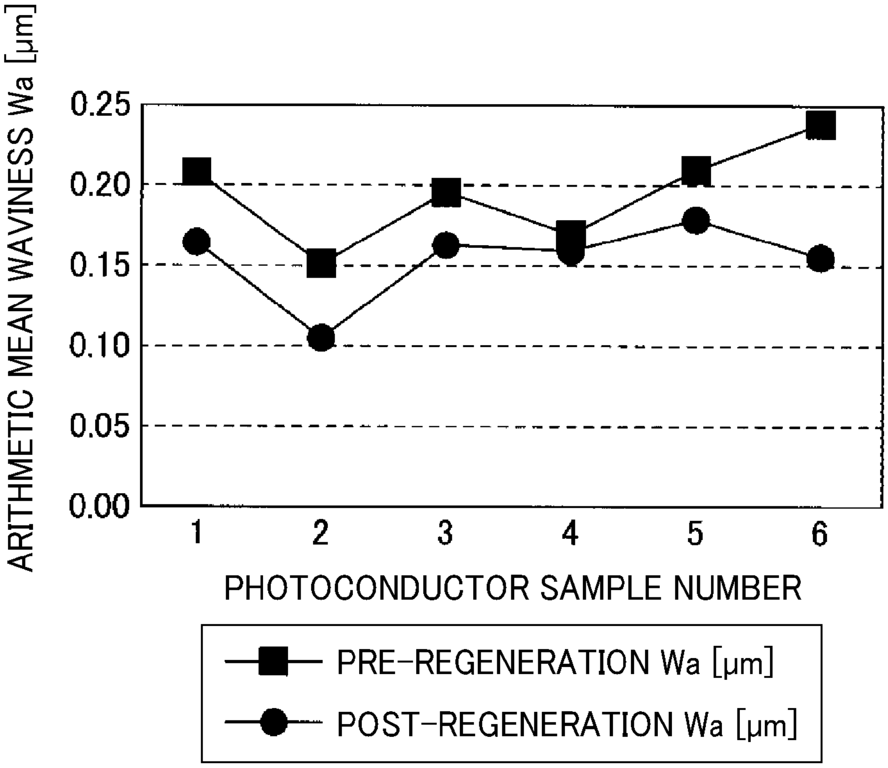
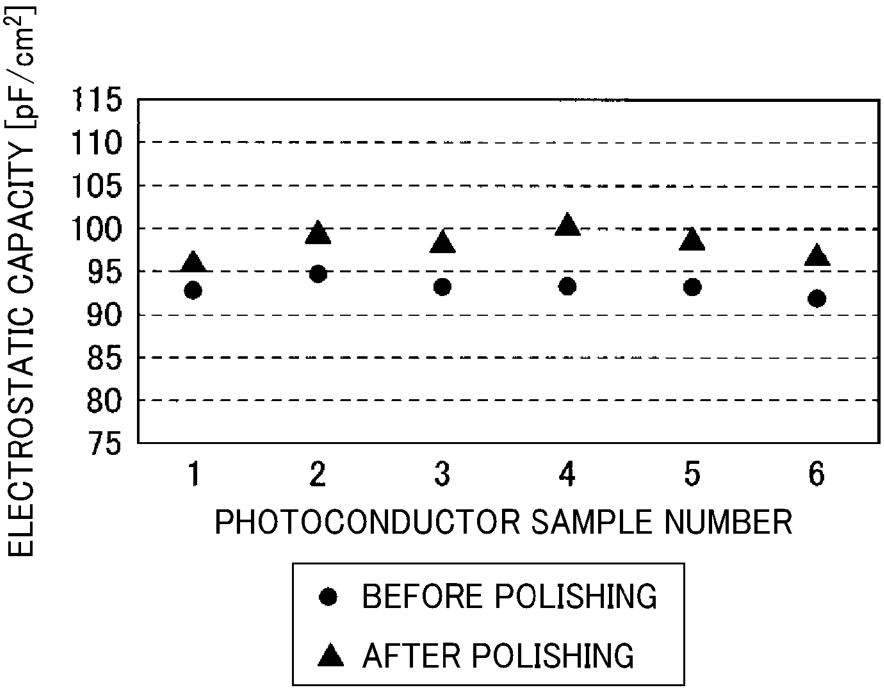

ARITHMETIC MEAN WAVINESS Wa [µm]
0.25
0.20
0.15
0.10
0.05
0.00
1
2
3
4
5
6
PHOTOCONDUCTOR SAMPLE NUMBER
PRE-REGENERATION Wa [µm]
POST-REGENERATION Wa [µm]

FIG. 9


ELECTROSTATIC CAPACITY [pF/cm²]
115
110
105
100
95
90
85
80
75
1
2
3
4
5
6
PHOTOCONDUCTOR SAMPLE NUMBER
BEFORE POLISHING
AFTER POLISHING

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EUROPEAN SEARCH REPORT

Application Number
EP 20 19 2894

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Place of search	Date of completion of the search	Examiner
Munich	18 January 2021	Rubio Sierra, F

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