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(54) Benævnelse: **Fremgangsmåde og indretning til behandling af overfladen af et trykmedium**

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METHOD AND DEVICE FOR TREATING THE SURFACE OF A PRINTING MEDIUM

Field of the Invention

The invention relates to a method and a device for treating the surface of a printing medium, in particular for printing water-soluble inks on films.

Background of the Invention

In addition to the printing methods based on printing plates (in particular flexographic printing, gravure printing and offset printing), digital printing methods in which the printing ink is applied to the film without a printing plate have also become increasingly established for plastic films. For example, the printing ink can be applied to the film using the inkjet method. Water-soluble printing inks can also be used, which is particularly advantageous when printing food packaging.

Plastic films made of polypropylene (PP) or polyethylene (PE), for example, are generally non-polar, which makes printing with water-soluble and therefore polar inks more difficult. For a clean, permanent bond between a liquid and a substrate surface, the surface energy of the substrate (also called surface tension) should slightly exceed the surface tension of the liquid, for example by about 2 to 10 mN/m. However, the surface energy of plastics is generally significantly lower than the surface tension of water-soluble liquids. It is therefore necessary or at least expedient in many cases to treat such plastic films before printing in order to increase their surface energy and to ensure sufficient adhesion of the polar water-soluble ink to the plastic film.

For example, a mediating layer (so-called “primer”) with increased polarity can be applied to the plastic film before the actual printing. However, this involves an additional procedural step, which is associated with corresponding time and cost requirements. In addition, the transfer layer must be dried before printing, which further increases the time required.

Alternatively, the plastic film can be physically and/or chemically treated before printing to increase the polarity of the surface of the plastic film and to ensure sufficient adhesion of water-soluble inks to the plastic film. Physical and/or chemical treating of surface can, for example, comprise a plasma treatment, as described by way of example

in WO 2016/188964 A1. Alternatively, corona treatment is also possible. Both processes can be used to adjust the surface tension or surface energy of the plastic film and thus ensure adhesion even of water-soluble printing inks.

However, the degree of polarity or surface energy required for a good printing result depends on the properties of the printing liquid and other printing parameters as well as on the properties of the film, such as its material and thickness.

EP 3 248 805 A1 describes a method for corona treatment or plasma treatment of printing media in order to adapt the surface energy of the printing medium. A liquid is printed onto the printing medium, the printing result is analyzed, and depending on the analyzed printing result, the treating of surface of the printing medium is adapted.

Other similar methods for treating the surface are known from the publications EP 2 743 090 A1, US 2015/0251453 A1 and US 2015/0258814 A1.

EP 3 124 256 A1 describes methods for treating the surface of a printing medium, in which the result of treating of the the surface is captured before printing with a reflectivity measurement of the surface-treated surface using a hyperspectral camera.

Therefore, there is a need for improved method of treating the surface that allows for precise physical and/or chemical treating of a surface of the printing medium that is adapted to the printing parameters and/or the printing medium.

Overview of the Invention

This object is achieved by a method for treating the surface of a printing medium according to claim 1 and by a device for treating the surface of a printing medium according to claim 8. The dependent claims relate to advantageous further developments.

A method according to the invention for treating the surface of a printing medium comprises physical and/or chemical treatment of a surface of the printing medium, comprising a setting of a surface tension or surface energy of the printing medium; applying several samples of a test liquid onto the physically and/or chemically treated surface of the printing medium, wherein the several samples are applied so as to be distributed across a width of the printing medium in a direction perpendicular to a transport direction of the printing medium; detecting a behaviour of the test liquid on the physically and/or chemically treated surface across the width of the printing medium, wherein the behaviour of the test liquid comprises a contact behaviour and/or a flow

behaviour of the test liquid on the surface and wherein from the detected behaviour of the test liquid, spatial variations of surface properties of the printing medium are captured; and adapting the physical and/or chemical treatment of the surface of the printing medium as a function of the detected behaviour, comprising an adaptation of the surface tension or surface energy of the printing medium.

Applying a test liquid onto the physically and/or chemically treated surface of the printing medium and detecting a behaviour of the test liquid on the surface can, according to the invention, enable an adaptation of the physical and/or chemical treatment of the surface and thus ultimately an adaptation of the physical and/or chemical treatment to parameters which are adapted to the printing method, the printing liquid used, the printing medium or its surface properties. In this way, the physical and/or chemical treatment can be adapted to different surfaces or different printing media as well as different printing liquids or different printing speeds.

In one embodiment, detecting comprises a specifying of a contact angle and/or of a droplet diameter and/or a spreading behaviour of the test liquid on the surface. In some examples, conclusions can be drawn about the polarity or surface tension or surface energy of the printing medium, and the physical and/or chemical treatment of the surface of the printing medium can be adapted accordingly.

Detecting the behaviour of the test liquid can in particular comprise optical detection.

By optical detection, for example using a camera or an optical sensor, a contact angle and/or a drop diameter and/or a spreading behaviour of the test liquid on the surface can be reliably specified.

In one embodiment, the physical and/or chemical treatment of the surface comprises adapting the surface tension or surface energy of the printing medium to a predetermined printing liquid.

Adapting the physical and/or chemical treatment of the surface can in particular involve adapting the surface tension or surface energy of the printing medium to a predetermined printing liquid.

The physical and/or chemical treatment of the surface or the adaptation can comprise setting a surface tension or a surface energy of the printing medium in the range of up to +/- 5 mN/m, in particular up to +/- 3 mN/m.

By adapting the surface tension or surface energy over the aforementioned ranges, excellent printing results can be achieved for many different printing media, especially different plastic films.

Any type of treating the surface can be understood as physical and/or chemical treatment within the meaning of the disclosure. In particular, this includes a reactive treating the surface that is configured to modify a polarity or surface tension or surface energy of the surface.

In one embodiment, the physical and/or chemical treatment comprises an electrochemical treatment.

In principle, all techniques for physically and/or chemically treatment of a surface of the printing medium can be used within the scope of the teaching according to the invention, depending on the properties of the printing medium and the printing liquid.

Physical and/or chemical treatment may in particular comprise treating the surface of the printing medium with a particle stream, for example a stream of charged particles and/or free radicals.

Physical and/or chemical treating the surface may in particular comprise a corona treatment and/or plasma treatment and/or flaming the surface and/or treating the surface with radicals.

By physically and/or chemically treating the surface in conjunction with the adaptation according to the invention, in some embodiments, coating the printing medium or coating a surface of the printing medium for the purpose of adapting the surface properties can be dispensed with.

In some embodiments, the surface of the printing medium therefore does not comprise a coating, in particular a primer.

Method efficiency is increased by eliminating a separate coating step and method costs are reduced.

In one embodiment, the adaptation of the physical and/or chemical treatment takes place automatically in a feedback loop as a function of the detected behaviour

In particular, at least one parameter recorded when detecting the behaviour of the test liquid can be compared with a preset target parameter. Based on the comparison, the physical and/or chemical treating the surface of the printing medium can be adapted such that the recorded parameter changes towards the preset target parameter or reaches the preset target parameter or a preset target corridor.

A feedback loop allows automatic adaptation of the physical and/or chemical treatment to different films and printing speeds.

A test liquid within the meaning of the disclosure can be any liquid which is suitable for allowing conclusions to be drawn about the surface properties, in particular the surface tension or surface energy, upon detection of its behaviour on the physically and/or chemically treated surface.

In particular, the test liquid may comprise or be a pressure liquid. In one embodiment, the test liquid may be the printing liquid or ink intended for printing on the surface of the printing medium.

The printing liquid may comprise or be a water-soluble ink.

Method according to any one of the preceding claims, furthermore comprising: applying a printing liquid onto the physically and/or chemically treated surface of the printing medium after the adaptation.

In one embodiment, the printing liquid is applied using the inkjet printing method.

The printing liquid may comprise or be a water-soluble ink.

The sample of the test liquid can take place in the printing method. In particular, the sample of the test liquid can be applied to the physically and/or chemically treated surface of the printing medium using the inkjet method.

The printing medium may comprise plastic and/or paper and/or cardboard and/or metal as well as any other material suitable for printing.

In one embodiment, the printing medium comprises a film, in particular a plastic film, for example a plastic film extruded by blow molding.

The film may, for example, comprise polyethylene terephthalate (PET) and/or polyethylene (PE) and/or low density polyethylene (LDPE) and/or biaxially oriented polypropylene (BOPP).

In some embodiments, applying the sample of the test liquid and detecting the behaviour of the test liquid may take place in a calibration environment that is spatially and functionally separated from the printing environment.

In other embodiments, the application of the sample of the test liquid and/or the detection of the behaviour of the test liquid can be carried out prior to printing on the printing medium (inline).

In one embodiment, the printing medium is moved, in particular continuously moved, during the physical and/or chemical treatment and/or the application of the at

least one sample and/or the detection and/or the adaptation and/or the application of the printing liquid.

In one embodiment, multiple samples of the test liquid or different test liquids can be applied and detected distributed over a width of the printing medium.

In this way, the measurement accuracy or setting accuracy can be further improved. In addition, spatial variations in the properties of the printing medium can be captured and quantified via the behaviour of the test liquid(s).

The invention also relates to a computer-readable program or a computer-readable product, which comprises computer-readable instructions, wherein computer-readable instructions are configured to carry out a method with one or all of the aforementioned features.

The invention further relates to a device for treating the surface of a printing medium with a treatment unit which is configured for the physical and/or chemical treatment of a surface of the printing medium, wherein the physical and/or chemical treatment of the surface comprises a setting of a surface tension or surface energy of the printing medium, an application unit which is configured for applying several samples of a test liquid distributed across a width of the printing medium in a direction perpendicular to a transport direction of the printing medium onto the physically and/or chemically treated surface of the printing medium, a detection unit which is configured for detecting a behaviour of the test liquid on the physically and/or chemically treated surface, wherein the behaviour of the test liquid comprises a contact behaviour and/or a flow behaviour of the test liquid on the surface, wherein the detection unit is configured to detect the behaviour of the test liquid across the width of the printing medium, and wherein the device (10; 30) is furthermore configured to capture spatial variations of surface properties of the printing medium from the detected behaviour; and a controller which is configured for adapting the physical and/or chemical treatment of the surface of the printing medium as a function of the detected behaviour, comprising an adaptation of the surface tension or surface energy of the printing medium.

The device can in particular be configured to carry out a method with one or all of the features described above.

In one embodiment, the treatment unit and/or the application unit and/or the detection unit are configured or positioned in series along a transport direction of the printing medium.

In one embodiment, the device additionally comprises a printing unit for applying a printing liquid onto the physically and/or chemically treated surface of the printing medium after the adaptation.

The printing unit can in particular be configured or positioned in series with the treatment unit and/or the application unit and/or the detection unit along a transport direction of the printing medium.

In one embodiment, the device additionally comprises a transport unit for transporting the printing medium in a transport direction along the treatment unit and/or the application unit and/or the detection unit and/or the printing unit.

The detection unit may comprise an optical sensor, in particular an optical sensor for specifying a contact angle and/or a droplet diameter and/or a spreading behaviour of the test liquid on the surface.

Brief Description of the Drawings

The characteristics and numerous advantages of the solution according to the invention can best be understood from a description of exemplary embodiments with reference to the drawings in which:

Fig. 1 shows a schematic representation of a device for treating the surface of a printing medium according to an embodiment;

Fig. 2 shows a schematic representation of a device for treating the surface of a printing medium according to another embodiment;

Fig. 3 shows schematically the detection of a contact angle and a drop diameter of a test liquid with a detection unit according to an embodiment;

Fig. 4a a. 4b show schematically the detection of a spreading behaviour of a test liquid with a detection unit according to an embodiment; and

Fig. 5 shows a flow chart of a method for treating the surface of a printing medium according to an embodiment.

Description of Embodiments

Embodiments are described below for the example of treating the surface or printing of a plastic film, in particular a plastic film for food packaging. However, the method and the device according to the invention can be used for a variety of different printing media.

Figure 1 shows a device 10 for treating the surface of a printing medium 12, for example a plastic film, in a schematic side view. In the embodiment shown, the plastic film is moved from left to right along the direction of arrow x. The plastic film can, for example, have been produced in a blow extrusion device (not shown) which is arranged upstream of the device 10.

The device 10 comprises a treatment unit 14, an application unit 16 and a detection unit 18, which are arranged in this order along the direction of movement x above the plastic film 12 and face an upper side of the plastic film 12 and are immediately adjacent. In addition, the device 10 comprises a controller 20, which is communicatively coupled to the treatment unit 14, the application unit 16 and the detection unit 18, for example via a line connection or wirelessly.

The treatment unit 14 is configured to physically and/or chemically treat the surface of the plastic film 12 in order to modify the surface properties of the plastic film 12 and in particular to adjust the polarity of the surface or the surface tension or surface energy to a predetermined target interval or a predetermined target value relative to a printing liquid. The treatment unit 14 can, for example, be a corona unit which is configured to generate a corona discharge and directs a stream of charged particles 22 generated by the corona discharge onto the surface of the plastic film 12. The charged particles, in particular electrons and/or ions, can then chemically react with the atoms or molecules of the plastic film 12 on its upper side, whereby the surface properties of the plastic film 12 can change and in particular its polarity can be increased. In this way, the surface energy of the plastic film 12 can be adapted to the surface tension of a predetermined printing liquid such that the surface energy of the plastic film 12 slightly exceeds the surface tension of the printing liquid, for example by about 2 to 10 mN/m. The plastic film 12 can then generally be easily printed with the printing liquid.

In other embodiments, the treatment unit 14 comprises a plasma unit, as described in further detail, for example, in WO 2016/188964 A1. The effect on the plastic film 12 is similar to that of the corona unit described above.

Additionally or alternatively, the treatment unit 14 can also generate a stream of free radicals and direct them to the surface of the plastic film 12. Similar to the charged particles of a corona discharge or plasma discharge, free radicals can also bring about a modification of the surface properties of the plastic film 12, in particular changing its polarity and/or surface tension or surface energy.

The treatment unit 14 is controlled by means of the controller 20.

The application unit 16 is configured to apply at least one sample of a test liquid to the physically and/or chemically treated surface of the plastic film 12. The test liquid can, for example, be identical to a printing liquid intended for subsequent printing on the plastic film 12. In other embodiments, a test liquid is used that is different from the printing liquid. In general, any test liquid can be used whose detectable behaviour on the surface of the plastic film 12 allows conclusions to be drawn about the surface properties of the plastic film 12.

The application unit 16 can, for example, comprise a printing head 24 with a printing nozzle 26, similar to those known from an inkjet printing device for films. In response to a control signal from the controller 20, the printing head 24 can apply one or more drops of the test liquid to the surface of the plastic film 12 by means of the printing nozzle 26.

In some embodiments, the application unit 16 is configured to apply several drops of the test liquid across a width of the plastic film 12 (transverse to the direction of movement x). For this purpose, the application unit 16 can, for example, have a plurality of pressure nozzles 26 along a direction transverse to the direction of movement x or can be movable in a direction transverse to the direction of movement x.

The detection unit 18 is configured to detect a behaviour of the applied test liquid on the physically and/or chemically treated surface of the plastic film 12. For example, the detection unit 18 can comprise an optical sensor 28 with which a contact angle and/or a drop diameter and/or a spreading behaviour of the test liquid on the surface of the plastic film 12 can be captured.

Alternatively or in addition to the optical sensor 28, other types of sensors can be used to detect the behaviour of the test liquid on the physically and/or chemically treated surface. In particular, capacitive and/or inductive sensors can be used.

In the embodiment shown, the detection unit 18 provides the captured measured values to the controller 20, which controls the treatment unit 14 in response to the

captured measured values in order to adapt the physical and/or chemical treatment of the surface of the plastic film 12. By iteratively repeating physical and/or chemical treatment of the surface of the plastic film 12, applying the test liquid and detecting the test liquid and adjusting the physical and/or chemical treatment depending on the detected behaviour, the physical and/or chemical treatment can be adjusted in a feedback loop such that the detected surface properties of the plastic film 12 are at or close to predetermined target values or at predetermined target intervals. In this way, the surface properties of the plastic film 12, in particular its polarity or surface tension or surface energy, can be automatically adjusted to values suitable for subsequent printing. In particular, the device 10 shown can automatically adapt to plastic films 12 made of different materials or with different plastic film thicknesses.

In the same way, the physical and/or chemical treatment of the surface can be automatically adapted to changed printing parameters, for example to a change in the printing speed or transport speed of the plastic film 12 along the transport direction x, or to a changed ink composition.

In some embodiments, the device 10 shown can be used in a calibration environment that is functionally and/or spatially separated from the actual printing environment ("nearline" or "offline").

In other embodiments, the surface treatment device according to the invention is integrated into the printing environment ("inline"). A corresponding printing device 30 is shown as an example in Figure 2. The device shown corresponds essentially to the device 10 described above with reference to Figure 1, and corresponding elements are identified by the same reference numerals. However, the printing device 30 additionally comprises a printing unit 32, which is arranged downstream of the detection unit 18 in series along the transport direction x.

The printing unit 32 comprises one or more printing heads 34, each with one printing nozzle 36 or multiple printing nozzles 36, which are configured to apply a printing liquid, for example a water-soluble ink, to the physically and/or chemically treated surface of the plastic film 12 after the adaptation has taken place.

In some embodiments, the printing unit 32 can be controlled via the control unit 20, as shown schematically in Figure 2. In other embodiments, the printing unit 32 includes its own separate controller (not shown).

The printing device 30 of Figure 2 also comprises a transport unit 38 for transporting the plastic film 12 along the transport direction x from the treatment unit 14 via the application unit 16 and the detection unit 18 to the printing unit 32.

Figures 3, 4a and 4b show schematically and by way of example techniques for detecting the behaviour of the test liquid on the surface of the plastic film 12, as they can be used within the scope of the invention.

Figure 3 shows schematically in a side view a drop 40 of the test liquid, for example a water-soluble ink, applied to the surface of the plastic film 12 by means of the pressure nozzle 26 of the application unit 16. With the aid of the optical sensor 28 of the detection unit 18, a diameter d and/or a contact angle α of the liquid drop 40 can be determined, which enable conclusions to be drawn about the polarity or

surface tension or surface energy of the plastic film 12. The larger the contact angle a, the greater the polarity and wettability of the surface of the plastic film 12 and the more suitable the plastic film is in general for printing with a water-soluble ink.

Figures 4a and 4b schematically show a capturing of a spreading behaviour of the test liquid on the physically and/or chemically treated surface of the plastic film 12 by means of the optical sensor 28 of the detection unit 18. The spreading behaviour characterizes the dynamic spatial expansion of the liquid drop 40 on the surface of the plastic film 12.

Figure 4a illustrates the expansion of the liquid drop 40 at a first time after application, at which the liquid drop 40 has an expansion di. Figure 4b schematically illustrates the increase in the size of the liquid drop 40 compared to the size of Figure 4a (shown in dashed lines in Figure 4b for comparison) at a second, later point in time. The diameter of the liquid drop 40 has increased to a value d_2 greater than d_1. From the increase in size per unit of time and/or from a change in the shape of the drop 40, conclusions can also be drawn about the surface tension or surface energy or the polarity of the surface of the plastic film 12.

The controller 20 can then specifically control the treatment unit 14 on the basis of the values provided by the detection unit 18 in the feedback loop, for example by increasing or decreasing an electrical current for generating a corona discharge or plasma discharge of the treatment unit 14 in order to adjust the polarity or surface tension or surface energy of the plastic film 12 in such a way that the detected behaviour of the test liquid lies in a predetermined target corridor. For this purpose, the controller 20 can

comprise, for example, a programmable logic controller with corresponding control software. A relationship between the measured values detected by the detection unit 18 and the operating parameters of the treatment unit 14 and thus control parameters for the control can be determined, for example, empirically or by calibration.

Applying the test liquid and recording measured values at different points transverse to the transport direction x can increase the accuracy of the method and also allows manufacturing tolerances of the printing medium to be recorded by means of the behaviour of the test liquid on the physically and/or chemically treated surface.

Figure 5 shows a flow chart illustrating a method for surface treatment of a printing medium according to an embodiment.

In a first step S10, a surface of the printing medium is treated physically and/or chemically, for example by means of the charged particle stream of a corona discharge or a plasma discharge or by means of a stream of electrically neutral free radicals.

In a subsequent second step S12, at least one sample of a test liquid is applied to the physically and/or chemically treated surface of the printing medium.

In a subsequent third step S14, a behaviour of the test liquid on the physically and/or chemically treated surface is detected, for example optically by means of a sensor or a camera.

In a subsequent fourth step S16, the physical and/or chemical treatment of the surface of the printing medium is adapted depending on the detected behaviour, for example in a feedback loop.

The solution according to the invention makes it possible to provide plastic films 12 or other printing media with defined and reproducible surface properties for subsequent printing. The printing quality in the direct inkjet printing process can be significantly increased in this way without the need for an additional coating of the printing medium with a primer. Process efficiency is increased and process costs are reduced. The solution according to the invention also enables the user to examine or characterize printing media with regard to their printing capabilities.

The description of the exemplary embodiments and the drawings serve only to explain the invention and the advantages achieved thereby and is not intended to limit the invention; the scope of protection arises from the appended claims.

Reference Numerals

10	Device for treating of surface
12	Printing medium, plastic film
14	Treatment unit
16	Application unit
18	Detection unit
20	Controller
22	Stream of charged particles
24	Printing head of the application unit 16
26	Printing nozzle of the printing head 24
28	Optical sensor of the detection unit
30	Printing device
32	Printing unit
34	Printing head of the printing unit 32
36	Printing nozzle of the printing unit 32
38	Transport unit
40	Drop of a test liquid

Patentkrav

1. Fremgangsmåde til behandling af overfladen af et trykmedium (12) med følgende trin:

fysisk og/eller kemisk behandling af en overflade af trykmediet (12), omfattende en indstilling af en overfladespænding eller overfladeenergi af trykmediet (12);

påføring af flere prøver (40) af en testvæske på den fysisk og/eller kemisk behandlede overflade af trykmediet (12), hvor de adskillige prøver (40) påføres således, at de fordeles over en bredde af trykmediet (12) i en retning vinkelret på en transportretning (x) af trykmediet (12);

detektering af testvæskens adfærd på den fysisk og/eller kemisk behandlede overflade på tværs af trykmediets (12) bredde, hvor testvæskens adfærd omfatter en kontaktadfærd og/eller en strømningsadfærd af testvæsken på overfladen, og hvor der ud fra testvæskens detekterede adfærd opfanges rumlige variationer af overfladeegenskaber af trykmediet (12); og

tilpasning af den fysiske og/eller kemiske behandling af overfladen af trykmediet (12) afhængigt af den detekterede adfærd; omfattende en tilpasning af overfladespændingen eller overfladeenergien af trykmediet (12).

2. Fremgangsmåde ifølge krav 1, hvor detekteringen omfatter en bestemmelse af en kontaktvinkel og/eller af en dråbediameter og/eller en spredningsadfærd af testvæsken på overfladen.

3. Fremgangsmåde ifølge et af de foregående krav, hvor detekteringen af testvæskens adfærd omfatter en optisk detektering.

4. Fremgangsmåde ifølge et af de foregående krav, hvor den fysiske og/eller kemiske behandling af overfladen omfatter en coronabehandling og/eller en plasmabehandling og/eller en flambering og/eller en behandling med

radikaler.

5. Fremgangsmåde ifølge et af de foregående krav, hvor tilpasningen af den fysiske og/eller kemiske behandling sker automatisk i en tilbagekoblingssløjfe afhængigt af den detekterede adfærd.

6. Fremgangsmåde ifølge et af de foregående krav, yderligere omfattende: påføring af en trykvæske på den fysisk og/eller kemisk behandlede overflade af trykmediet (12) efter tilpasningen.

7. Computerlæsbart program, som omfatter computerlæsbare instruktioner, hvor de computerlæsbare instruktioner er indrettet til på en indretning ifølge et af kravene 8 til 11 at udføre en fremgangsmåde ifølge et af de foregående krav.

8. Indretning (10; 30) til behandling af overfladen af et trykmedie (12) med:
en behandlingsenhed (14), som er indrettet til den fysiske og/eller kemiske behandling af en overflade af trykmediet (12); hvor den fysiske og/eller kemiske behandling af overfladen omfatter en indstilling af en overfladespænding eller overfladeenergi af trykmediet (12);
en påføringsenhed (16), som er indrettet til at påføre flere prøver (40) af en testvæske, der er fordelt over en bredde af trykmediet (12) i en retning vinkelret på en transportretning (x) af trykmediet (12) på den fysisk og/eller kemisk behandlede overflade af trykmediet (12);
en detekteringsenhed (18), som er indrettet til at detektere en adfærd af testvæsken på den fysisk og/eller kemisk behandlede overflade; hvor testvæskens adfærd omfatter en kontaktadfærd og/eller en strømningsadfærd af testvæsken på overfladen;
hvor detekteringsenheden (18) er indrettet til at detektere adfærden af testvæsken på tværs af bredden af trykmediet (12); og

hvor indretningen (10; 30) endvidere er indrettet til at detektere rumlige variationer af overfladeegenskaber af trykmediet (12) ud fra den detekterede adfærd; og

en styreenhed (20), som er indrettet til at tilpasse den fysiske og/eller kemiske behandling af overfladen af trykmediet (12) afhængigt af den detekterede adfærd; omfattende en tilpasning af overfladespændingen eller overfladeenergien af trykmediet (12).

9. Indretning (10; 30) ifølge krav 8, hvor behandlingsenheden (14) og/eller påføringsenheden (16) og/eller detekteringsenheden (18) er indrettet på række langs en transportretning (x) af trykmediet (12).

10. Indretning (30) ifølge krav 8 eller 9, der desuden har en trykkeenhed (32) til påføring af en trykvæske på den fysisk og/eller kemisk behandlede overflade af trykmediet (12) efter tilpasningen.

11. Indretning (10; 30) ifølge et af kravene 8 til 10, hvor detekteringsenheden (18) omfatter en optisk sensor (28), især en optisk sensor (28) til at angive en kontaktvinkel og/eller en dråbediameter og/eller en spredningsadfærd af testvæsken på overfladen.

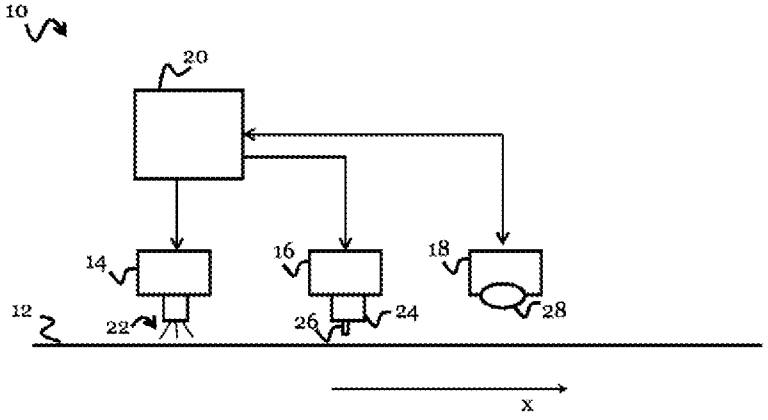

Fig. 1

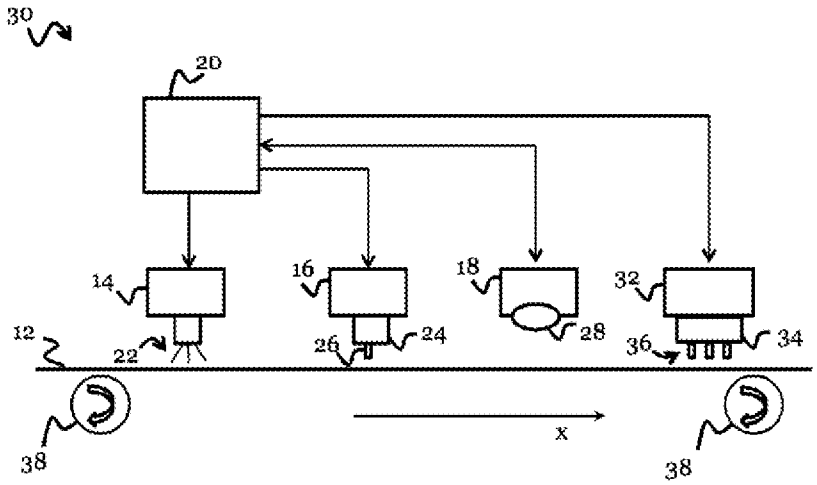

Fig. 2

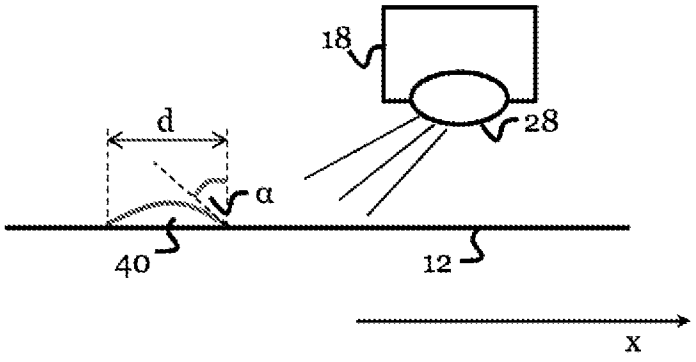

Fig. 3

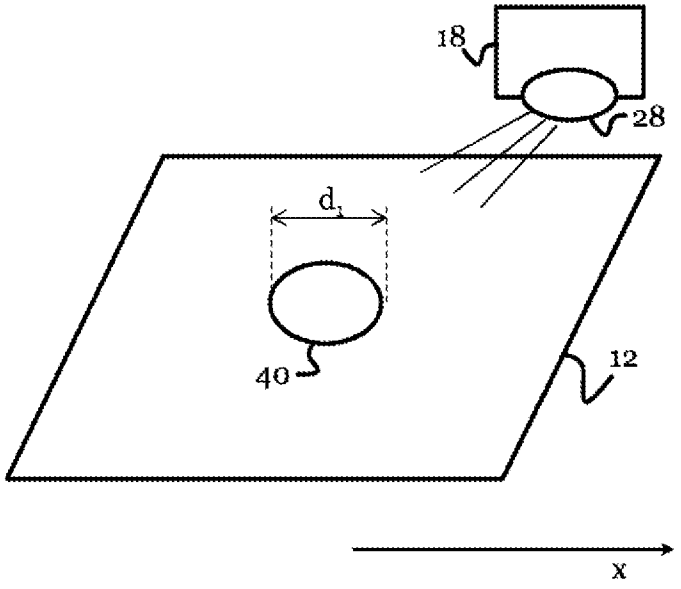

Fig. 4a

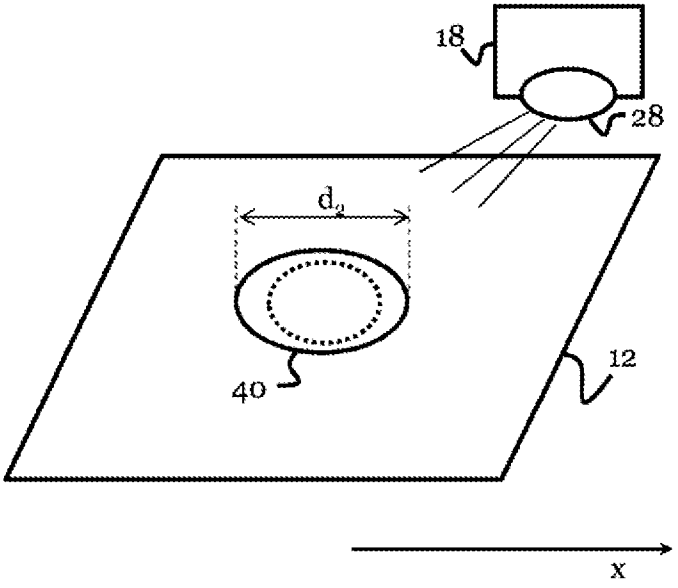

Fig. 4b

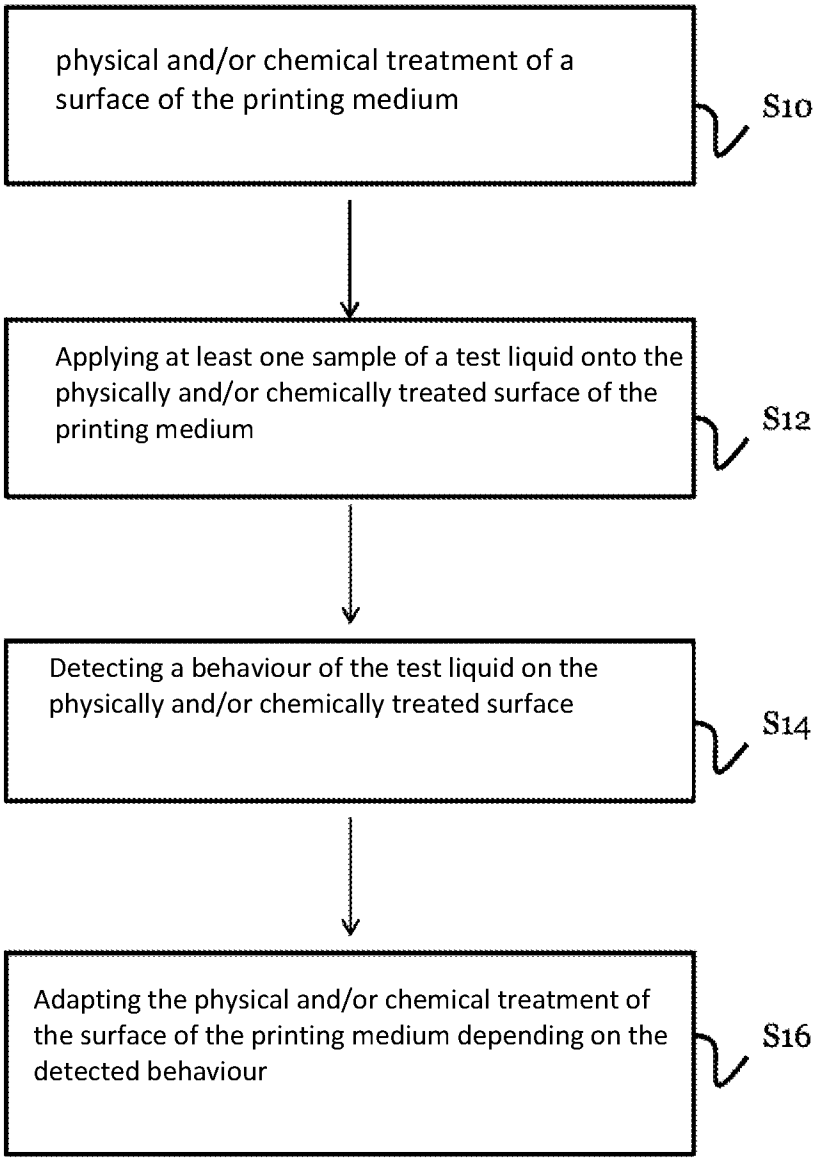
physical and/or chemical treatment of a surface of the printing medium
S10
Applying at least one sample of a test liquid onto the physically and/or chemically treated surface of the printing medium
S12
Detecting a behaviour of the test liquid on the physically and/or chemically treated surface
S14
Adapting the physical and/or chemical treatment of the surface of the printing medium depending on the detected behaviour
S16

Fig. 5