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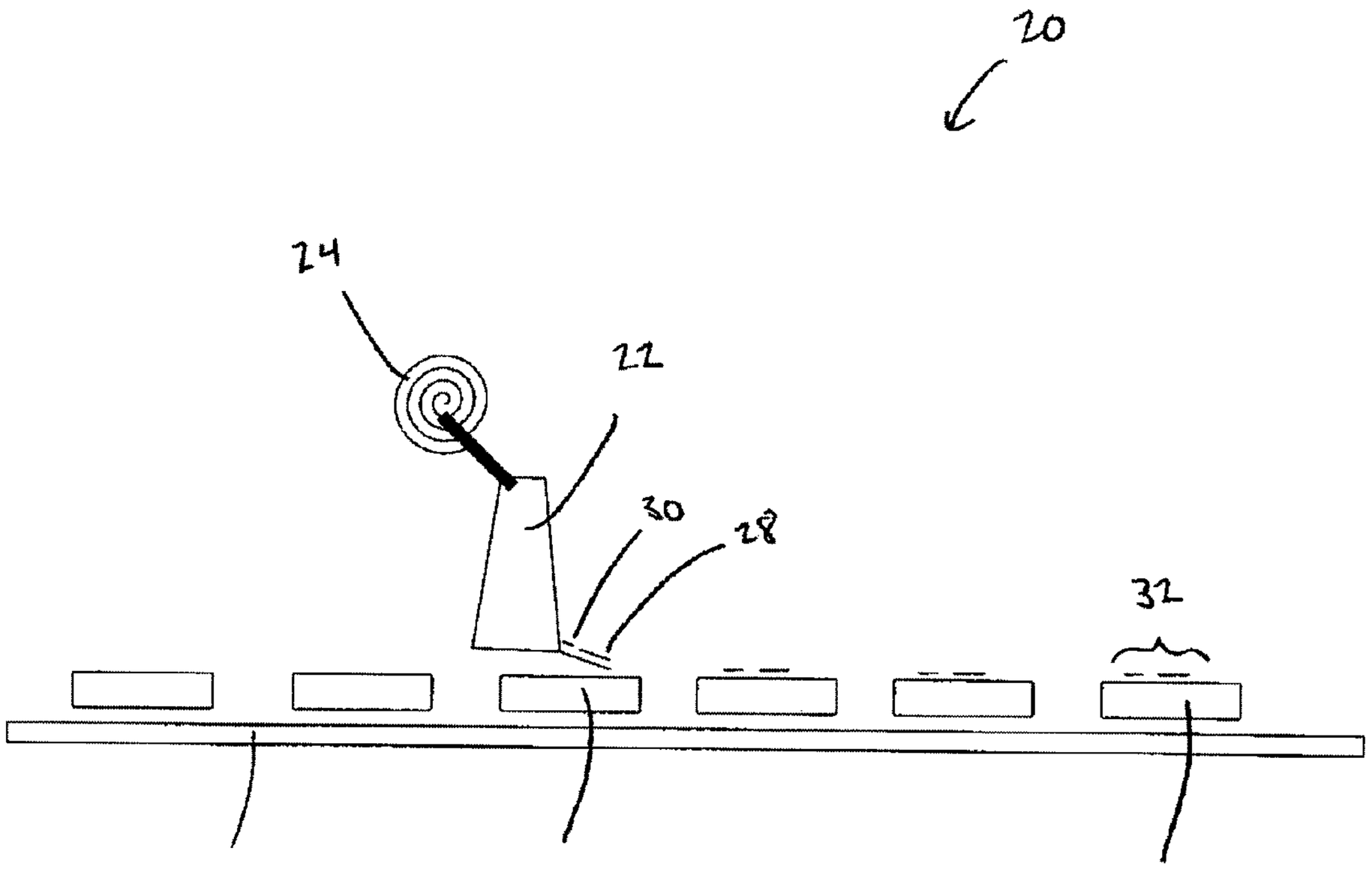
(54) Title: METHOD AND SYSTEM FOR APPLYING LABELS TO A SUBSTRATE



(57) Abrégé/Abstract:
A system for applying labels to a substrate comprises a label applicator in communication with a carrier, the carrier having a surface on which pressure-sensitive labels are disposed as a repeating sequence of pluralities of labels. Each of the pluralities comprises at least two labels. A conveyor brings a substrate into communication with the label applicator and the label applicator is configured to apply one of the pluralities of labels to the substrate.

METHOD AND SYSTEM FOR APPLYING LABELS TO A SUBSTRATE

Field of the Invention

[0001] The present invention relates generally to labeling and in particular, to a system for applying labels to a substrate and a method for same.

Background of the Invention

[0002] Pressure-sensitive labels, commonly referred to as "peel and stick" or "self adhesive" labels, are manufactured in a range of sizes and shapes for application to substrates such as commercial products. These labels can be formed of any of a variety of materials, such as plastic film, paper, synthetic paper, or metallized film, and have one side coated with adhesive that enables the label to be applied to the product. The labels are fabricated at a low cost, and can be applied to substrates in a reliable manner and at high speed using automated applicators.

[0003] Pressure-sensitive labels are used for a number of different purposes. Decorative labels can be used for aesthetic purposes, or can be printed with optically scannable information such as a universal product code (UPC) or a "barcode" for enabling a labeled substrate such as a commercial product to be identified by an optical scanner, for example. Functional labels comprise a functional device or a sensor, and can be applied to products for a variety of purposes including remote identification and electronic article surveillance (EAS). For example, a label including a radio frequency identification ("RFID") device applied to a product enables the product to be identified and/or tracked remotely by a suitable radio frequency-based detector. EAS devices, commonly known as "anti-theft" or "anti-shoplifting" devices, and enable an EAS labeled product to be detected by anti-theft detectors. Such EAS devices include electromagnetic (EM), acousto-magetic (AM), radio-frequency (RF), and microwave (MW) devices. Labels incorporating anti-theft devices are currently used for application to library books, for example, and to a wide range of commercial products.

[0004] Pressure-sensitive labels are typically supplied by label manufacturers in rolls, in which labels of one kind are disposed in a periodic order on the surface of a release liner. The labels can then be applied to substrates by hand or, in high-

volume manufacturing environments, by an applicator device that is loaded with a roll of the labels.

[0005] In some situations, it is required to apply multiple labels to a substrate. This can be accomplished by several different approaches. In one approach, multiple applicator devices are used to each apply a different label to the substrate in a single pass, with each applicator device being loaded with a respective liner roll comprising one kind of label. In another approach, a single applicator device loaded with a liner roll comprising one kind of label is used to apply the label to a substrate in a first pass. The applicator device is then loaded with a liner roll comprising another kind of label, which is then applied to the substrate in a second pass.

[0006] In still another approach, multiple functional devices, which could otherwise each be incorporated into individual labels and applied separately to a product, are integrated into a single label using packaging material. For example, U.S. Patent No. 7,345,583, to Reid et al. discloses a dual security label comprising a cover stock body comprising a first side and a second side, with an adhesive on the second side of the cover stock body. A first antitheft device may be adhered to the adhesive and a second antitheft device may be adhered to the adhesive. The exposed adhesive may be used for adhering the dual security label to products being sold by retailers or may be used for adhering to an enclosing member.

[0007] As label applicators are generally expensive, it is desirable to reduce the number of these equipments used for applying multiple labels to a substrate. It is also desirable to reduce the number of passes of the substrate, so as to increase the throughput and reduce the cost of the label application process. At the same time, it is desirable to avoid packaging of multiple devices into a single label, so as to avoid the use of packaging material and to thereby reduce the cost of the label application process.

[0008] It is an object of the present invention to provide a novel method and system for applying labels to a substrate.

Summary of the Invention

[0009] Accordingly, in one aspect there is provided a system for applying labels to a substrate comprising:

a label applicator in communication with a carrier, the carrier having a surface on which pressure-sensitive labels are disposed as a repeating sequence of pluralities of labels, each of the pluralities comprising at least two labels; and

a conveyor for bringing a substrate into communication with the label applicator, the label applicator being configured to apply one of the pluralities of labels to the substrate.

[00010] In another aspect, there is provided a method for applying labels to a substrate comprising:

providing a carrier having a surface on which pressure-sensitive labels are disposed as a repeating sequence of pluralities of labels, each of the pluralities comprising at least two labels; and

applying one of the pluralities of labels to the substrate using a label applicator.

[00011] In still another aspect, there is provided a label carrier having a surface on which pressure-sensitive labels are disposed as a repeating sequence of pluralities of labels, each of the pluralities comprising at least two labels.

Brief Description of the Drawings

[00012] Embodiments will now be described more fully with reference to the accompanying drawings in which:

[00013] Figure 1 is a schematic side view of the label application system.

[00014] Figures 2a and 2b are top-plan and side-elevation views, respectively, of a carrier on which labels are disposed, and for use with the label application system of Fig. 1;

[00015] Figure 3 is a schematic side view of a preparation system for the carrier of Fig. 2;

[00016] Figures 4a and 4b are schematic top-plan and side-elevation views, respectively, of another embodiment of a carrier on which labels are disposed, and for use with the label application system of Fig. 1; and

[00017] Figures 5a and 5b are schematic top-plan and side-elevation views, respectively, of another embodiment of a carrier on which labels are disposed, and for use with the label application system of Fig. 1.

Detailed Description of the Embodiments

[00018] The following is directed to a system and method for applying a plurality of pressure-sensitive labels to a substrate, such as an item of merchandise or a commercial product. The system utilizes a single label applicator that is loaded with a carrier onto which pluralities of labels are disposed in a repeating sequence. This arrangement of the labels on the carrier allows the label applicator to apply each of the labels in the plurality to the substrate simultaneously, and in what is essentially a single process. The method may be used to apply pressure-sensitive labels of any type to substrates in a high-speed/high-volume manner, and obviates the need for multiple label applicators to each apply one of the labels in the plurality to the substrate, or the need for multiple passes of the substrate when only a single label applicator is used. Various embodiments of the label application system and method will now be described with reference to Figures 1 to 5.

[00019] Turning now to Figures 1 to 3, a system for applying multiple labels to a substrate is shown, and is generally indicated by reference numeral 20. System 20 comprises a label applicator 22 that is in communication with a supply 24 of pressure-sensitive labels disposed on a carrier. In this embodiment, supply 24 comprises a carrier 26 onto which first labels 28 and second labels 30 are disposed in a repeating sequence of pluralities 32 (see Figure 2) where each plurality 32 comprises one first label 28 and one second label 30. System 20 also comprises a conveyor 34, which brings substrates 36 into communication with the label applicator 22 for the application of a plurality 32 of labels to each substrate 36 substantially simultaneously. By "substantially simultaneously", it is meant that both label 28 and label 30 of plurality 32 are applied to substrate 36 at the same time or at approximately the same time, and in what is essentially a single process. As is known in the art, label applicator 22 can be programmed to position labels 28 and 30 on substrate 36 in any desired arrangement.

[00020] System 20 may be used to apply pressure-sensitive labels of any size, shape, material, and function. In this embodiment, first label 28 is a radio-frequency ("RF") anti-theft label, and differs in shape from second label 30, which is an acousto-

magnetic ("AM") anti-theft label. However, first label 28 and second label 30 need not differ in shape, in function, or in any other aspect, and can therefore be identical.

[00021] Figure 2 shows the carrier 26 and labels 28 and 30 in detail. Carrier 26 is a release liner, and comprises a low-adhesion surface 42 onto which labels 28 and labels 30 are disposed. In this embodiment surface 42 is a silicone surface, but low-adhesion surface 42 can be any suitable low-adhesion surface known in the art. First label 28 and second label 30 each comprise an adhesive side 44 comprising an adhesive coating, and which is in contact with the low-adhesion surface 42 of carrier 26. As is known in the art, the silicone surface of low-adhesion surface 42 does not damage or remove the adhesive coating disposed on adhesive side 44, allowing labels 28 and 30 to be readily removed from carrier 26 by label applicator 22 and to adhere to substrates 36 upon application.

[00022] Figure 3 shows a carrier preparation system that may be used to prepare the supply 24, and is generally indicated by reference numeral 60. Carrier preparation system 60 comprises a first label applicator 62 and a second label applicator 64. First label applicator 62 is in communication with a supply (not shown) of first labels 28, and second label applicator 64 is in communication with a supply (not shown) of second labels 30. Carrier preparation system 60 also comprises a carrier supply 68, which is configured such that low-adhesion surface 42 of carrier 26 is brought into communication sequentially with first label applicator 62 and with second label applicator 64 for application of first labels 28 and second labels 30, respectively, to carrier 26. In this embodiment, first label 28 and second label 30 of are arranged in a single file longitudinally along carrier 26, and therefore such that the labels within each plurality 32 are arranged in single file. However, as will be appreciated, first label 28 and second label 30 can be arranged in any pattern to form a repeating sequence of pluralities 32. Carrier 26 with labels 28 and 30 disposed thereon is spooled to yield supply 24, which is then used in system 20 for the application of labels 28 and 30 to substrates 36.

[00023] First and second applicators 62 and 64 can be programmed to position labels 28 and 30 on carrier 26 as required, for example to provide a spacing of labels 28 and 30 on carrier 26 such that applicator 22 of system 20 can easily apply one label 28 and one label 30 as a plurality 32 to substrate 36. It will be appreciated that

accuracy and repeatability in the placement of labels 28 and 30 onto carrier 26 is required for subsequent use by system 20. This can be complicated if carrier preparation system 60 is operated at a high speed. However, accuracy in positioning may be achieved by using any suitable process monitoring equipment known in the art. For example, photoelectric sensors (not shown) can be used in conjunction with label applicators 62 and 64 to monitor the positioning of labels 28 and 30 onto carrier 26, and velocity sensors (not shown) and/or tachometers (not shown) may be used with air-driven shafts (not shown) associated with carrier supply 68 and/or supply 24 to provide velocity data of carrier 26 as it travels through carrier preparation system 60.

[00024] As will be appreciated, system 20 applies a plurality 32 of labels to substrate 36 without requiring interconnection, packaging, or bundling together in any way the labels within the plurality applied. Additionally, carrier 26 remains integral as it passes through both system 20 and through carrier preparation system 60, and it is not required that carrier 26 be cut or have seams formed in relation to labels 28 and 30 disposed thereon to facilitate the application of the labels to substrate 36. This removes need for any label packaging materials or carrier cutting equipment, which lowers the cost of the method relative to other methods for the application of multiple labels.

[00025] The labels can be any pressure-sensitive label known in the art, and can be decorative labels, alphanumeric labels, barcode labels (e.g. those comprising a product bar code such as a universal product code), or labels comprising a "functional device". The functional device can be any device or any sensor that can be integrated into a pressure-sensitive label such as, but not limited to, radio frequency identification ("RFID") devices; electronic article surveillance (EAS) devices (commonly known as "anti-theft" or "anti-shoplifting" devices), such as electromagnetic (EM), acousto-magetic (AM), radio-frequency (RF), and microwave (MW) devices. Such labels include, but are not limited to, radio-frequency identification (RFID) labels, such as those manufactured by UPM Raflatac of Fletcher, North Carolina and Checkpoint Systems, Inc. of Thorofare, New Jersey; acousto-magnetic (AM) labels, such as those manufactured by Tyco International, Ltd. of Princeton, New Jersey; and radio-frequency (RF) labels, such as those

manufactured by ALL-TAG Security of Boca Raton, Florida, and by Checkpoint Systems, Ltd.

[00026] The label applicators can be any label applicators known in the art. A wide variety of existing label application equipment may be used with the systems described above, such as those manufactured by Accraply of Minneapolis, Minnesota, and Label-Aire of Fullerton, California, and such as for example the Accraply model 350 or the Accraply model 380.

[00027] The labels within the plurality may be arranged in any way. Figures 4a and 4b show an alternative arrangement of labels on a carrier, in which a first label 128 and a second label 130 are arranged in a "side-by-side" arrangement along the length of carrier 26. It will be appreciated that still other arrangements are possible.

[00028] Although the above embodiments describe systems and methods for applying a plurality of pressure-sensitive labels to a substrate, where the plurality of labels comprises two labels, the systems and methods described can be used to apply any number of labels to the substrate. For example, Figure 5 shows an arrangement in which a plurality 232 of pressure-sensitive labels comprises three labels, namely first label 228, second label 230, and third label, disposed on a carrier 26.

[00029] Although embodiments have been described above with reference to the accompanying drawings, those of skill in the art will appreciate that variations and modifications may be made without departing from the spirit and scope thereof as defined by the appended claims.

What is claimed is:

1. A system for applying labels to a substrate comprising:

a label applicator in communication with a carrier, the carrier having a surface on which pressure-sensitive labels are disposed as a repeating sequence of pluralities of labels, each of the pluralities comprising at least two labels; and

a conveyor for bringing a substrate into communication with the label applicator, the label applicator being configured to apply one of the pluralities of labels to the substrate.

2. A system according to claim 1, wherein the labels are selected from the group consisting of decorative labels, alphanumeric labels, barcode labels, and labels comprising a functional device.

3. A system according to claim 2, wherein the functional device is selected from the group consisting of electromagnetic devices, acousto-magnetic devices, radio frequency devices, microwave devices, and radio frequency identification devices.

4. A system according to any one of claims 1 to 3, wherein at least one of the at least two labels is an anti-theft label.

5. A system according to any one of claims 1 to 4, wherein the at least two labels are non-identical.

6. A system according to any one of claims 1 to 4, wherein the at least two labels are identical.

7. A system according to any one of claims 1 to 6, wherein the at least two labels are applied to the substrate substantially simultaneously.

8. A system according to any one of claims 1 to 7, wherein the at least two labels are arranged in single file longitudinally along the carrier.

9. A method for applying labels to a substrate comprising:

providing a carrier having a surface on which pressure-sensitive labels are disposed as a repeating sequence of pluralities of labels, each of the pluralities comprising at least two labels; and

applying one of the pluralities of labels to the substrate using a label applicator.

10. A method according to claim 9, wherein the labels are selected from the group consisting of decorative labels, alphanumeric labels, barcode labels, and labels comprising a functional device.

11. A method according to claim 10, wherein the functional device is selected from the group consisting of electromagnetic devices, acousto-magnetic devices, radio frequency devices, microwave devices, and radio frequency identification devices.

12. A method according to any one of claims 9 to 11, wherein at least one of the at least two labels is an anti-theft label.

13. A method according to any one of claims 9 to 12, wherein the at least two labels are non-identical.

14. A method according to any one of claims 9 to 12, wherein the at least two labels are identical.

15. A method according to any one of claims 9 to 14, wherein the at least two labels are applied to the substrate substantially simultaneously.

16. A method according to any one of claims 9 to 15, wherein the at least two labels are arranged in single file longitudinally along the carrier.

17. A label carrier having a surface on which pressure-sensitive labels are disposed as a repeating sequence of pluralities of labels, each of the pluralities comprising at least two labels.

18. A carrier according to claim 17, wherein the labels are selected from the group consisting of decorative labels, alphanumeric labels, barcode labels, and labels comprising a functional device.

19. A carrier according to claim 18, wherein the functional device is selected from the group consisting of electromagnetic devices, acousto-magnetic devices, radio frequency devices, microwave devices, and radio frequency identification devices.

20. A carrier according to any one of claims 17 to 19, wherein at least one of the at least two labels is an anti-theft label.

21. A carrier according to any one of claims 17 to 20, wherein the at least two labels are non-identical.

22. A carrier according to any one of claims 17 to 20, wherein the at least two labels are identical.

23. A carrier according to any one of claims 17 to 22, wherein the at least two labels are arranged in single file longitudinally along the carrier.

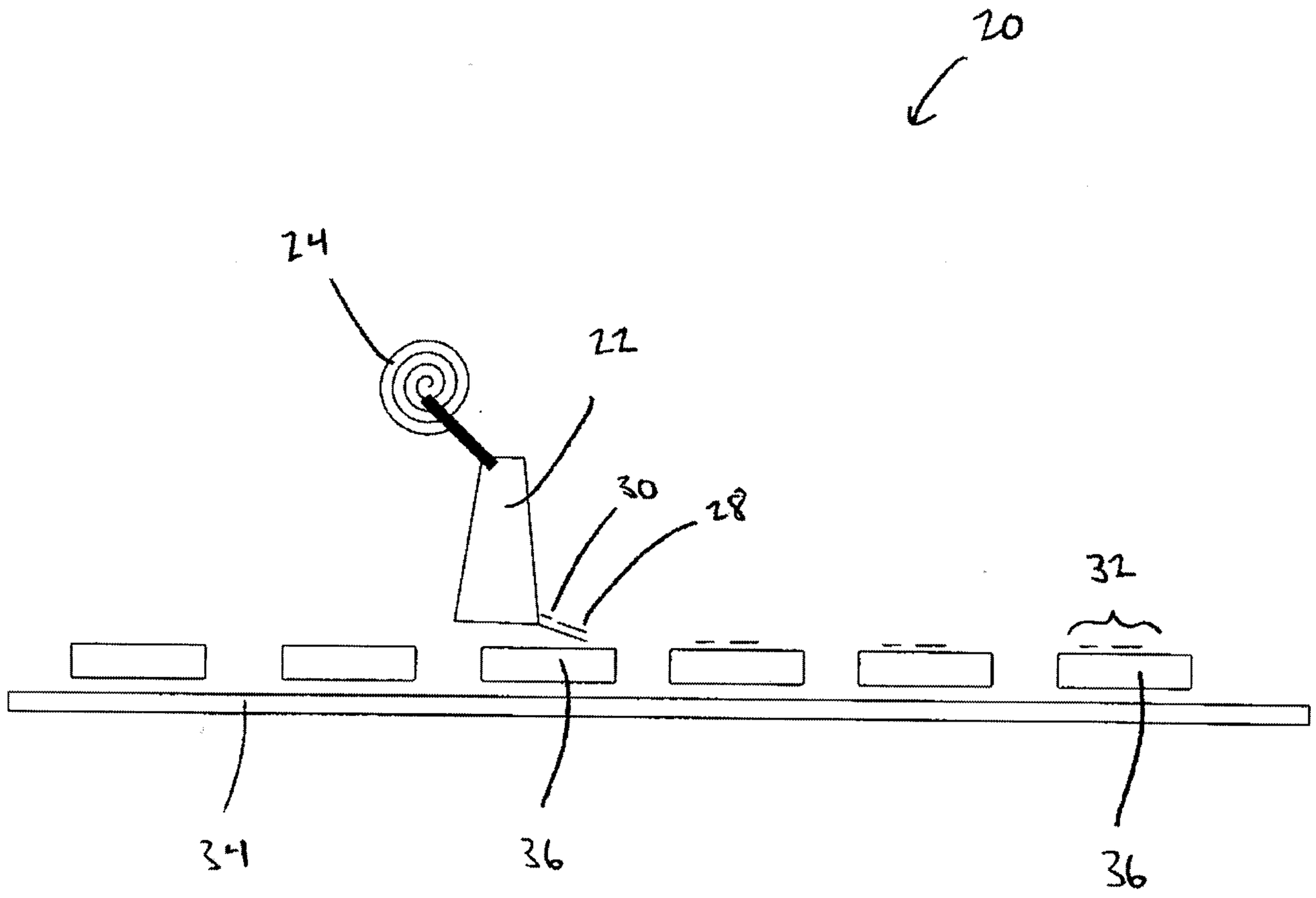


Figure 1

Figure 2a

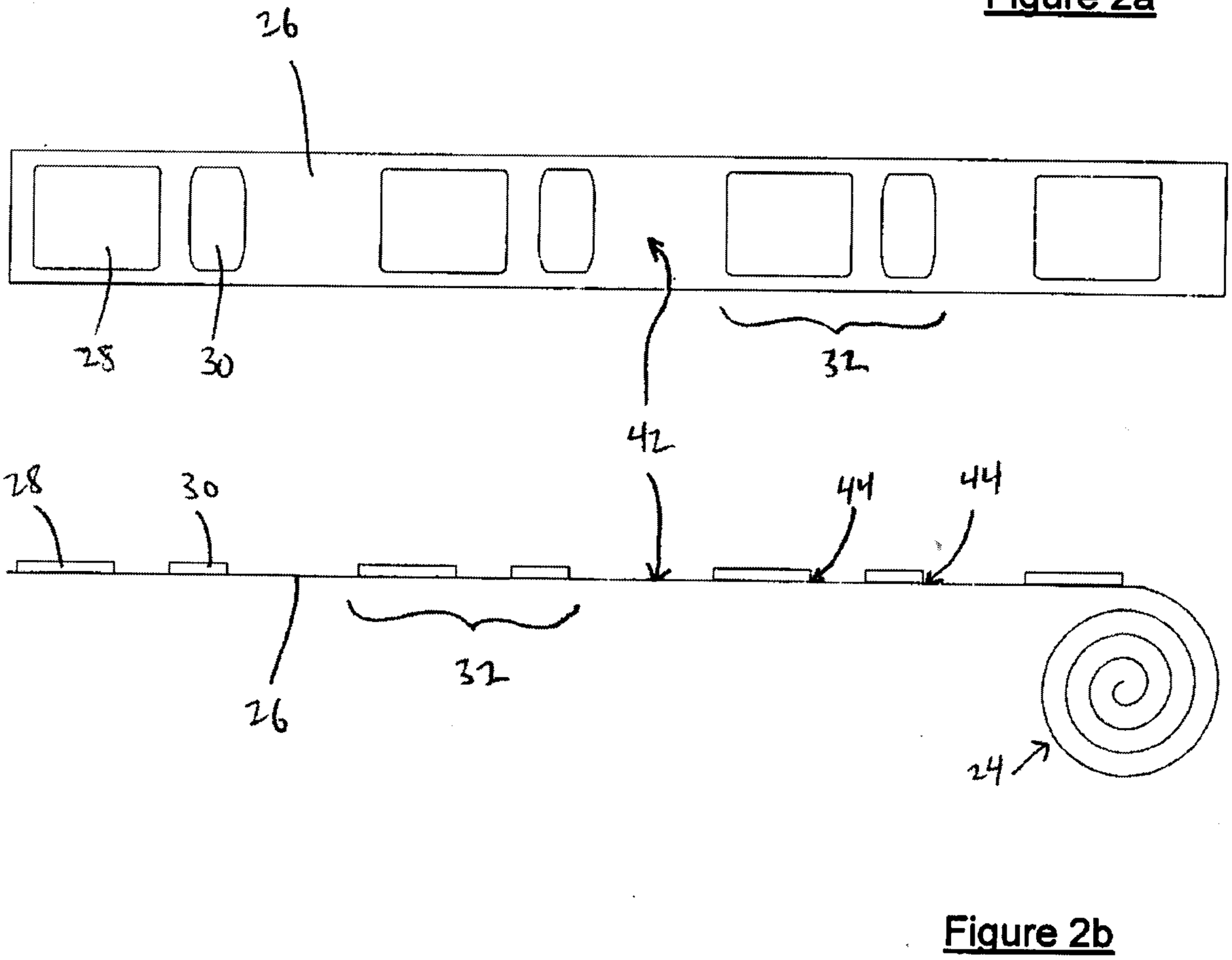


Figure 2b

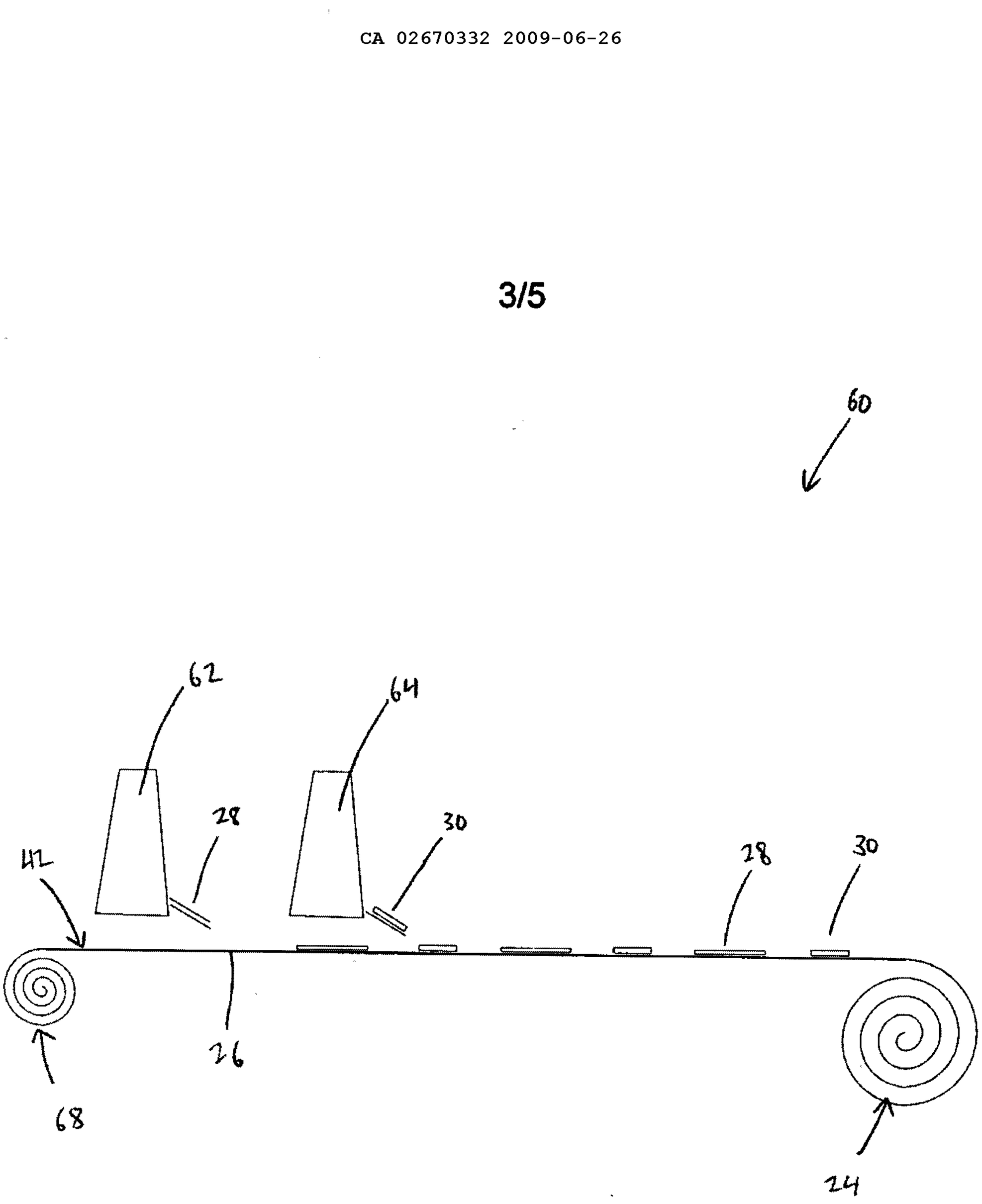


Figure 3

Figure 4a

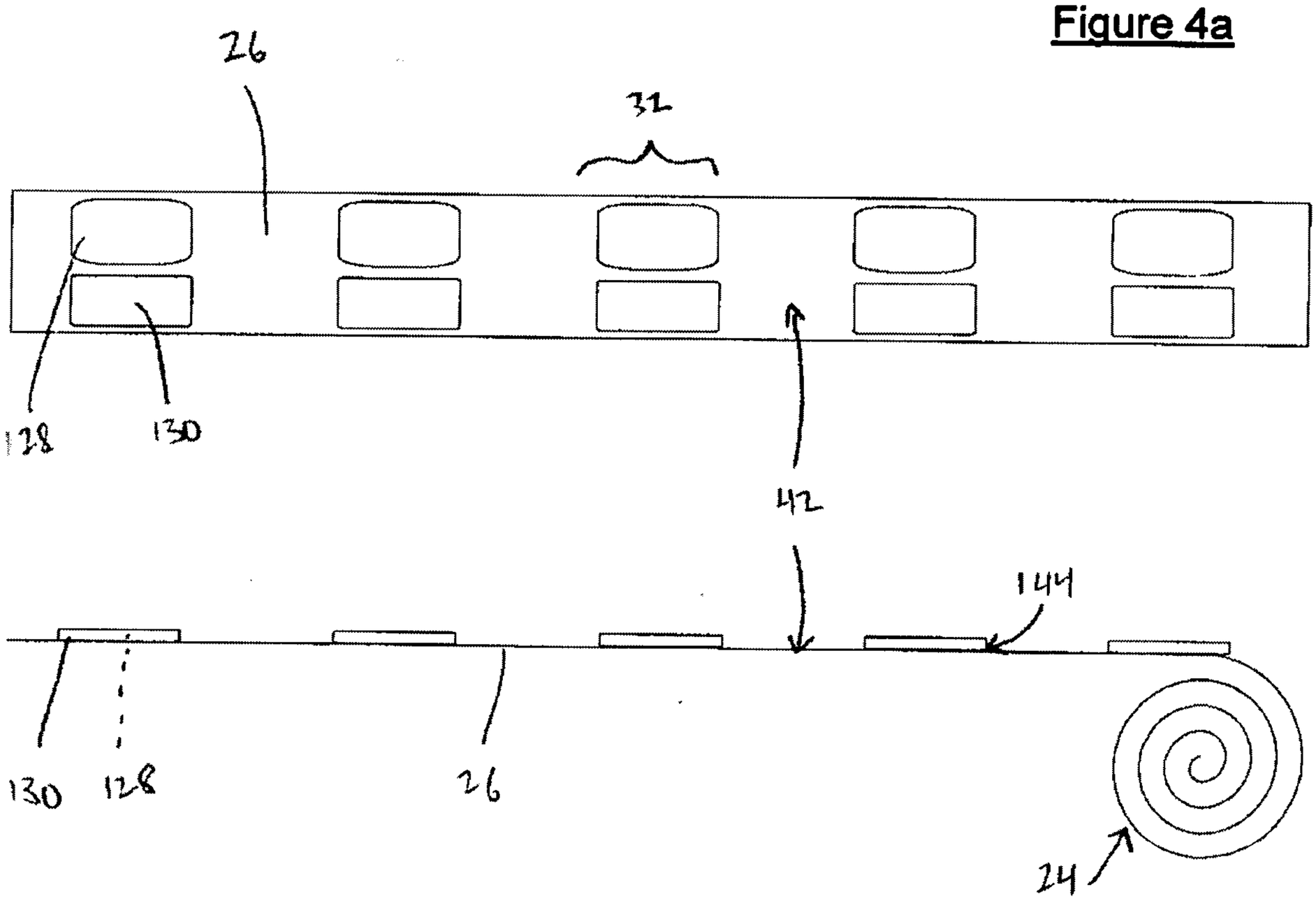


Figure 4b

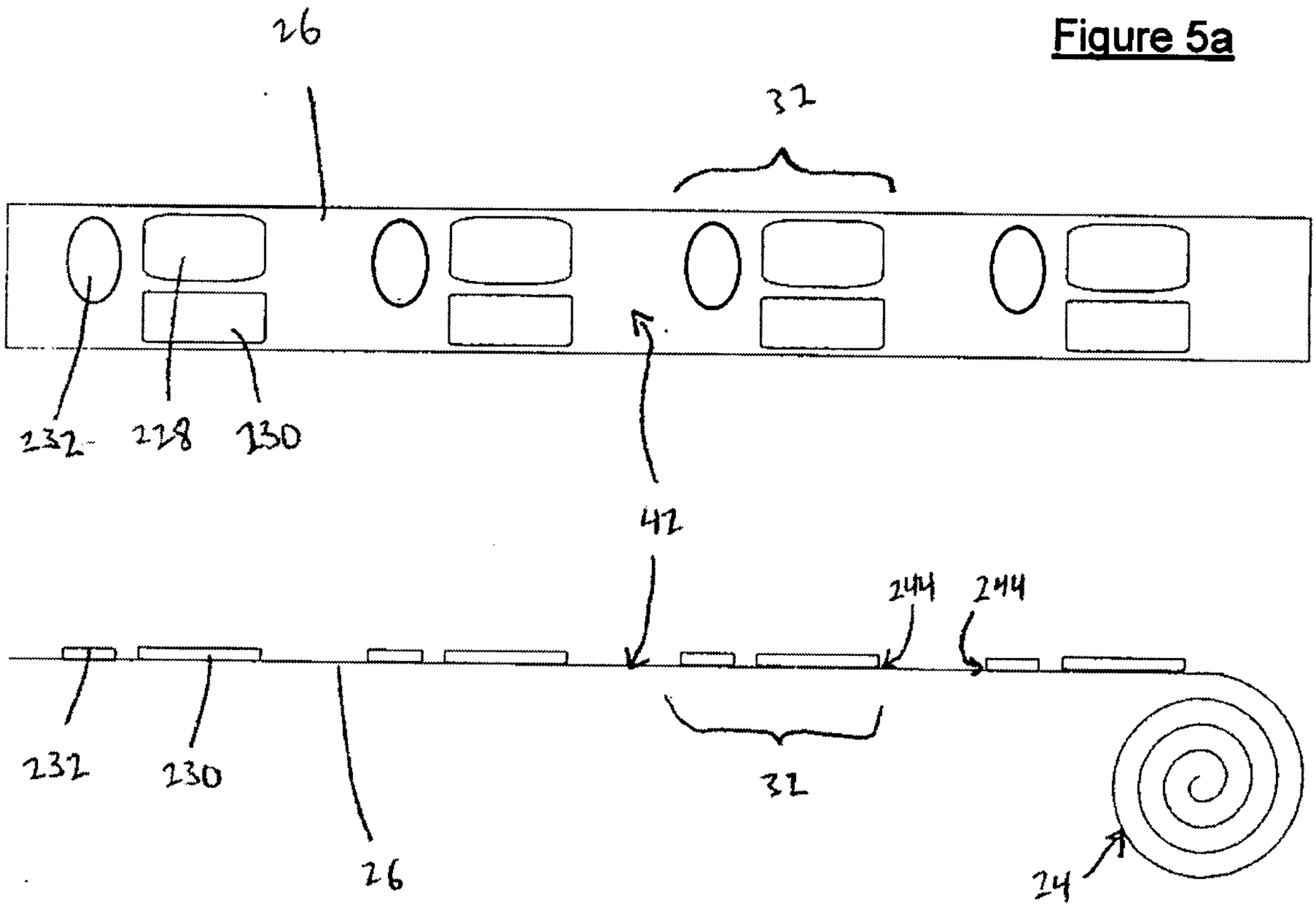
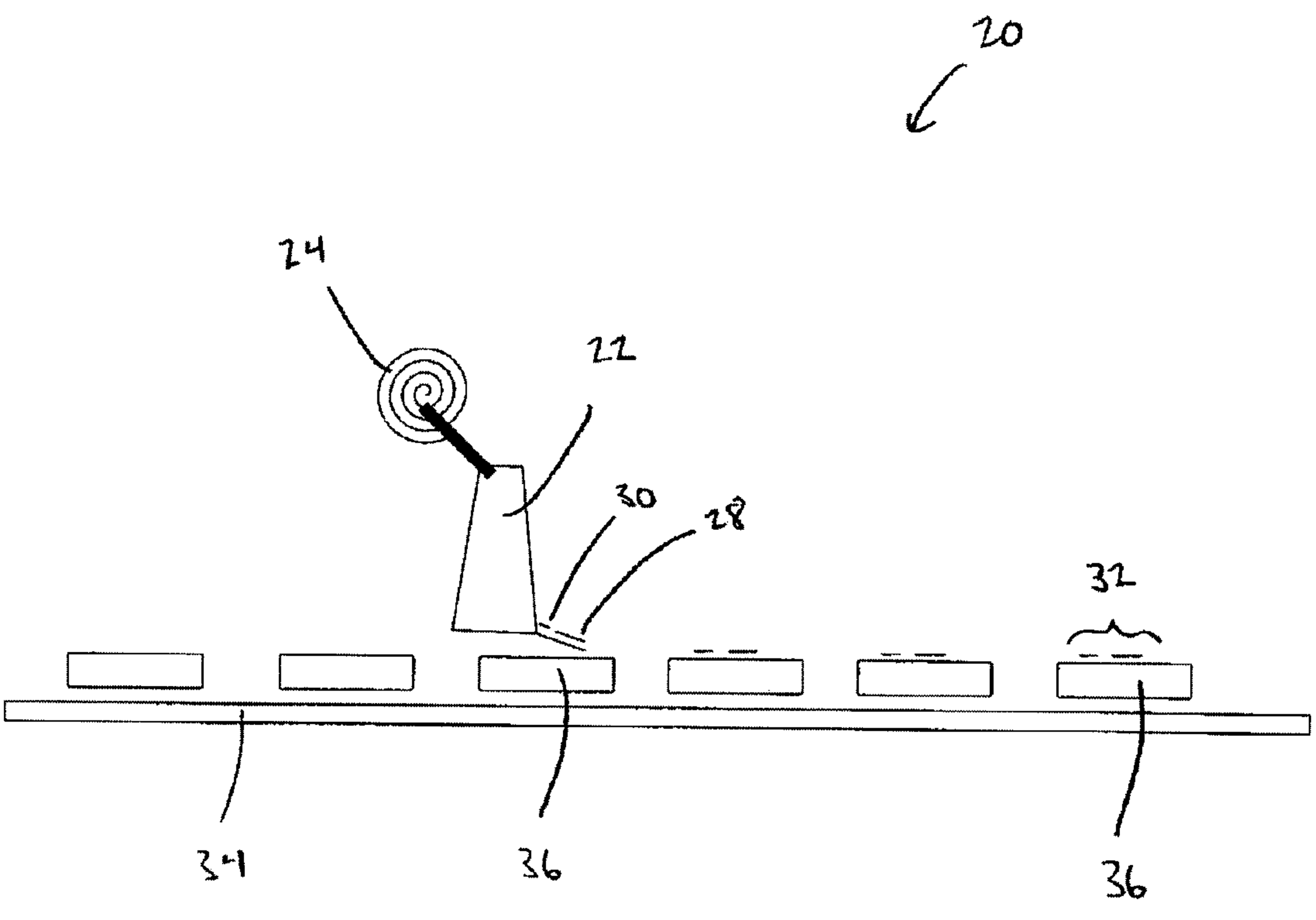


Figure 5a

Figure 5b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