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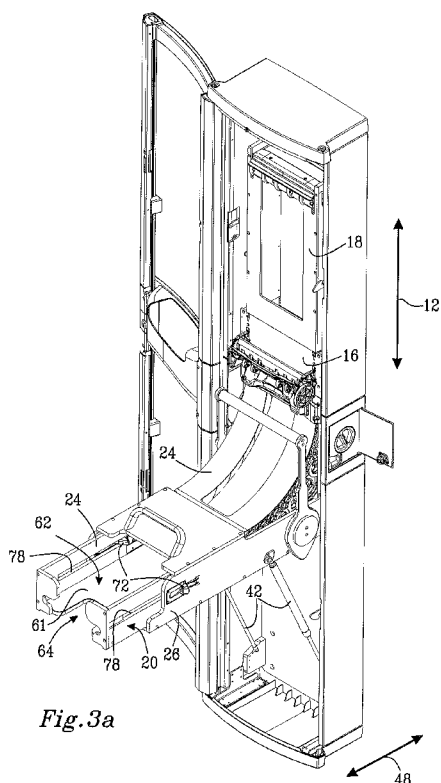


Fig. 3a

(57) **Abstract:** A dispenser (2) for dispensing a sheet of web material from a stack of folded web material is provided. The dispenser (2) comprises: a housing (4) arranged to be positioned along a vertical direction (12), a dispensing arrangement (14) including a dispensing opening (8) for the web material in the housing (4), and a web material storage section (16) inside the housing (4) arranged to hold and support the stack of folded web material. The web material storage section (16) comprises an upper end portion (18) and opposite thereto a lower end portion (20), and a stack supporting surface. The web material is arranged to be lead to the dispensing arrangement (14) from the upper end portion (18) and the stack of folded web material is arranged to be supported by the stack supporting surface. The dispenser (2) comprises a supporting arrangement (72) for supporting, at least temporarily, the stack of folded web material at a distance from the stack supporting surface.



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DISPENSER

TECHNICAL FIELD

The present invention relates to a dispenser for dispensing web material.

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BACKGROUND

A sheet material for e.g. wiping purposes may be provided in the form of a stack.

Different kinds of dispensers for holding such a stack of sheet material, and for

dispensing separate sheets of sheet material from such a stack, are known. Generally,

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there may be distinguished between two kinds of dispensers for stacks of sheet material;

a first kind of dispenser from which sheet material is dispensed from a bottom end of the

stack, and second kind of dispenser from which sheet material is dispensed from a top

end of the stack. The first kind of dispenser is easily replenished with sheet material by

placing fresh sheet material on top of sheet material remaining in the dispenser. This

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kind of dispenser has the drawback that the weight of large stacks of sheet material

tends to make the dispensing of sheet material from the bottom end difficult. In the

second kind of dispenser, irrespective of the weight of the stack, sheet material is easily

dispensed from the top end. On the other hand, replenishing a dispenser of the second

kind may pose a problem because the stack often has to be replenished from the bottom

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end. It may be mentioned that in some types of dispensers, e.g. dispensers for napkins,

the stack may be arranged in a horizontal direction. The stack may be biased towards a

dispensing opening and napkins may be dispensed from a top of the stack from the

dispensing opening. Replenishing the latter type of dispensers may pose its own

particular problems.

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US 2809082, with reference to its Fig. 6, discloses a dispenser wherein paper is fed from a top of a stack. The stack is replenished from its bottom. How replenishing is to be performed in practice is not discussed.

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WO2007/000153 discloses a double dispenser for dispensing of disposable paper. Each dispenser unit comprises: a stack magazine for accommodating a folded paper web; an advancing unit for conveying the paper web out of the stack magazine for further use; a

detaching device for detaching the disposable paper towels from the paper web, and; a dispensing unit for dispensing the detached disposable paper towels from the dispenser. Paper web is replenished by placing new paper web beneath remaining web paper in the dispenser and gluing the new paper to the remaining web paper. Apparently the
5 remaining web paper has to be lifted and supported manually while the new paper web is placed in the stack magazine.

US 2011/0101020 discloses a dispenser comprising a housing with a back plate and a cover. A base of the cover is articulated on a connecting pin. A support-container holds a
10 stack of pre-cut material which is in use and can hold a spare stack. A base of the support-container is articulated around the same axis of rotation and the cover internally has a horizontal plate which supports the stack in use after swiveling the cover and support-container to load the spare stack. The support-container fits inside and is dismountably attached to the housing after swiveling into the internal space of the
15 housing, which causes downward displacement of the stack in use, allowing the spare stack to be inserted into the internal space. That is, the support-container is turned upside down to access a bottom of the stack in use for replenishing the dispenser with the spare stack. The stack in use and the spare stack are joined to each other after positioning the spare stack on the other stack.

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There exists a need for an alternative arrangement for replenishing a dispenser with a package of folded web material from a bottom end of a stack of folded web material in a dispenser.

25 SUMMARY

An object of the present invention is to provide a dispenser wherein access is provided beneath a stack of folded web material for replenishing the dispenser with a package of folded web material.

30 According to an aspect of the invention, the object is achieved by a dispenser for dispensing a sheet of web material from a stack of folded web material. The dispenser comprises: a housing arranged to be positioned along a vertical direction, a dispensing arrangement including a dispensing opening for the web material in the housing, and a

web material storage section inside the housing arranged to hold and support the stack of folded web material. The web material storage section comprises, seen along the vertical direction, an upper end portion and opposite thereto a lower end portion and a stack supporting surface. The web material is arranged to be lead to the dispensing
5 arrangement from the upper end portion and the stack of folded web material is arranged to be supported by the stack supporting surface. The dispenser comprises a supporting arrangement for supporting, at least temporarily, the stack of folded web material at a distance from the stack supporting surface.

10 Since the dispenser comprises the supporting arrangement for supporting the stack of folded web material at a distance from the stack supporting surface, during replenishing of the dispenser, the stack of folded web material may be supported by the supporting arrangement allowing a package of folded web material to be inserted beneath the stack of folded web material. As a result, the above mentioned object is achieved.

15 The dispenser may be a standalone unit or may be mounted to a structure such as a wall, a piece of furniture, or a door. The dispenser may be arranged for manual dispensing of web material through the dispensing opening by a user pulling on a tail of the web material. The dispenser may alternatively be arranged for automatic dispensing
20 of web material through the dispensing opening. The automatic dispensing may comprise electrically powered feeding of web material or a mechanical feeding of web material. In both cases a user may actuate the feeding.

The web material may be provided as a continuous web material which is folded to form
25 a stack of folded web material. Similarly, a package of folded web material for replenishing a stack of folded web material in a dispenser may comprises a continuous web material. Herein, the term "replenishing" not only relates to the replenishing of a dispenser which is partially filled with a stack of folded web material, but is understood to also encompass loading of an empty dispenser. From a tail of web material from the
30 stack of folded web material sheets of web material are separated during dispensing. Dispensed sheets of web material from the dispenser may be used as towels, napkins, for general wiping, etc. The folded web material may be Z-folded in an accordion-like manner to form the stack of folded web material. The web material may comprise one or more web layers. In the case of more than one web layer, the layers are interfolded in

the stack. One or more sheets of web material may be separated from the web material in the dispenser during dispensing from the dispenser. For this purpose the web material may be provided with lines of weakness, perforations. Alternatively, the web material may be non-perforated, in which case the dispenser may be provided with a cutting

5 arrangement or tearing arrangement for separating a sheet from the tail of web material. One or more packages of folded web material are arranged to be placed in the web material storage section of the dispenser to form a stack of folded web material. The tail of the web material is arranged to extend from the upper end portion of the web material storage section to the dispensing opening of the dispenser. The tail of the web material
10 may change direction one or more times inside the dispenser between the upper end portion of the web material storage section and the dispensing opening.

According to embodiments, the dispensing opening may be arranged above the lower end portion, seen along the vertical direction. In this manner at least part of a stack of
15 folded web material arranged in the dispenser is arranged below the dispensing opening. A general extension of dispenser is thus established.

According to embodiments, the dispenser may be arranged for dispensing web material from a top of the stack of folded web material.

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According to embodiments, the supporting arrangement may be movable between a support position in which the supporting arrangement is arranged to support the stack of folded web material and a release position in which the supporting arrangement is arranged to release the stack of folded web material. In this manner the stack of folded
25 web material may be released from the supporting arrangement, e.g. after replenishing of the dispenser has been completed.

According to embodiments, the supporting arrangement may be arranged to support the stack of folded web material, at least temporarily, in at least two positions along the
30 vertical direction in the web material storage section. In this manner the stack of folded web material may be supported in different position in the web material storage section as it is replenished with packages of folded web material.

According to embodiments, the web material storage section may comprise a displaceable portion. In this manner a user may easily access a bottom end of a stack of folded web material in the dispenser for replenishing the stack from the bottom end. The displaceable portion may for instance be pivotable or longitudinally movable.

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According to embodiments, the displaceable portion may comprise the lower end portion and the stack supporting surface, and wherein the lower end portion, seen along the vertical direction, is arranged substantially underneath the upper end portion when the displaceable portion is arranged in a dispensing position, and wherein the displaceable portion is displaceable from the dispensing position to a tilted loading position, in which tilted loading position the lower end portion is positioned beside and below the upper end portion, seen along the vertical direction. In this manner a tilting of the displaceable portion may provide easy access to a bottom end of a stack. Moreover, when the displaceable portion is in the tilted loading position, an inner surface of the displaceable portion may support a creased side of a package of folded web material, which package has been placed in the displaceable portion below a bottom end of a stack of folded web material present in the displaceable portion.

According to embodiments, the supporting arrangement may be movable from the support position to the release position when the displaceable portion is displaced from the loading position to the dispensing position. In this manner a stack of folded web material present in the dispenser may be automatically released from being supported by the supporting arrangement to be supported by the stack supporting surface.

According to embodiments, the displaceable portion may comprise the stack supporting surface and the displaceable portion may be displaceable along the vertical direction. In this manner a package of folded web material placed on the supporting surface may be transported upwardly in the web material storage section. Displacement along the vertical direction may be a longitudinal displacement. The displaceable portion may be manually displaceable.

According to embodiments, the supporting arrangement may be arranged to move upwardly along the vertical direction together with the displaceable portion. In this

manner the supporting arrangement may be positioned along the vertical direction by the supporting arrangement. Again, the displaceable portion may be manually displaceable.

According to embodiments, the supporting arrangement may be arranged to engage
5 with the web material storage section above the lower end portion. In this manner the supporting arrangement may at least temporarily support a stack of folded web material along the vertical direction in the web material storage section, e.g. while a user replenishes the dispenser with a package of folded web material.

10 According to embodiments, the supporting arrangement may be arranged to be disengaged from the web material storage section by a package of folded web material being moved upwardly along the vertical direction with the displaceable portion. In this manner the supporting arrangement may be conveniently disengaged.

15 Further features of, and advantages with, the present invention will become apparent when studying the appended claims and the following detailed description. Those skilled in the art will realize that different features of the present invention may be combined to create embodiments other than those described in the following, without departing from the scope of the present invention, as defined by the appended claims.

20 BRIEF DESCRIPTION OF THE DRAWINGS

The various aspects of the invention, including its particular features and advantages, will be readily understood from the following detailed description and the accompanying drawings, in which:

25 Fig. 1 illustrates a dispenser for dispensing at least one sheet of web material according to embodiments,

Fig. 2 illustrates the dispenser of Fig. 1 with a door in an open position,

Figs. 3a and 3b illustrate the dispenser of Figs. 1 and 2 with a displaceable portion in a tilted loading position,

30 Fig. 4 illustrates a portion of the displaceable portion of the dispenser illustrated in Figs. 1 – 3b,

Fig. 5 illustrates a portion of a web material storage section of a dispenser according to embodiments,

Fig. 6 illustrates a portion of a web material storage section of a dispenser according to embodiments,

Figs. 7a – 7c illustrate the displaceable portion and a supporting arrangement of Fig. 6 during replenishing a relevant dispenser,

5 Fig. 8a illustrates schematically a cross section through a stack of folded web material according to embodiments,

Fig. 8b illustrates a package of folded web material according to embodiments,

Figs. 9a – 9e illustrate a method of replenishing a dispenser with a package of folded web material, and

10 Fig. 9a' illustrates an alternative lower end portion of a dispenser according to embodiments and the replenishing of the dispenser with a package of folded web material.

DETAILED DESCRIPTION

15 The present invention will now be described more fully with reference to the accompanying drawings, in which example embodiments are shown. However, this invention should not be construed as limited to the embodiments set forth herein. Disclosed features of example embodiments may be combined as readily understood by one of ordinary skill in the art to which this invention belongs. Like numbers refer to like
20 elements throughout. Well-known functions or constructions will not necessarily be described in detail for brevity and/or clarity.

Fig. 1 illustrates a dispenser 2 for dispensing at least one sheet of web material according to embodiments. The dispenser 2 comprises a housing 4. The housing 4 is
25 arranged to be positioned along a vertical direction 12. Thus, the housing 4 has a natural top end and a bottom end when the dispenser 2 is installed at a site for dispensing sheets of web material therefrom. The housing 4 comprises a door 6. In the door 6, a dispensing opening 8 is provided for dispensing the sheet of web material. The door 6 is arranged to be opened and thus, to provide access to an interior of the dispenser 2, e.g.
30 for the purpose of replenishing the dispenser 2 with packages of folded web material. The door 6 may be locked in a closed position by means of a locking arrangement 10.

Fig. 2 illustrates the dispenser 2 of Fig. 1 with the door 6 in an open position. The dispenser 2 is arranged for dispensing web material from a stack of folded web material which may be Z-folded in an accordion-like manner. The stack has been omitted in Fig. 2 for clarity reasons. The dispenser 2 comprises a dispensing arrangement 14 including the dispensing opening 8. A web material storage section 16 is provided inside the housing 4. The web material storage section 16 is arranged to hold and support the stack of folded web material.

The web material storage section 16 comprises, seen along the vertical direction 12, an upper end portion 18 and opposite thereto a lower end portion 20. The web material is arranged to be lead to the dispensing arrangement 14 from the upper end portion 18 and the stack of folded web material is arranged to be supported at the lower end portion 20. For supporting the stack at the lower end portion 20, the web material storage section 16 comprises a stack supporting surface 21. In these embodiments the stack supporting surface 21 is provided by two bottom elements 22. For supporting the stack along the vertical direction 12, the web material storage section 16 comprises side elements 24 on four sides thereof. Accordingly, the stack of web material is arranged to be substantially enclosed in the web material storage section 16. Some of the side elements 24 may be flexible. Some side elements 24 may be provided with openings for providing access to the interior of the web material storage section 16.

The web material storage section 16 comprises a displaceable portion 26. The displaceable portion 26 is displaceable from a dispensing position to a tilted loading position. In Fig. 2 the displaceable portion 26 is illustrated in the dispensing position and in Figs. 3a and 3b the displaceable portion 26 is illustrated in the tilted loading position. The displaceable portion 26 comprises the lower end portion 20 of the web material storage section 16. When the displaceable portion 26 is arranged in the dispensing position, the lower end portion 20, seen along the vertical direction 12, is arranged substantially underneath the upper end portion 18. Accordingly, when the displaceable portion 26 is arranged in the dispensing position, the door 6 may be closed and users may dispense sheets of web material from the dispensing opening 8. At least in the dispensing position, the dispensing opening 8 is arranged above the lower end portion 20, seen along the vertical direction 12. Accordingly, at least part of a stack of web

material arranged in the web material storage section 16 is arranged below the dispensing opening 8.

5 The web material is arranged to be lead to the dispensing arrangement 14 from the upper end portion 18 and the stack of folded web material is arranged to be supported by the stack supporting surface 21. Thus, the dispenser 2 is arranged for dispensing from a top of the stack of folded web material. In use, a tail of the web material extends from the top of the stack of folded web material supported in the web material storage section 16 to the dispensing opening 8 in the closed door 6. When the dispenser 2 has
10 been newly replenished with folded web material, the top of the stack of folded web material may be in a region of the upper end portion 18 of the material storage section 16. Accordingly, the tail of web material extends from the upper end portion 18 to the dispensing opening 8. On the other hand, when most of the web material in the dispenser 2 has been dispensed, the top of the stack of folded web material is in a
15 region of the lower end portion 20 of the material storage section 16. In this case the tail of web material extends through the web material storage section 16, from its lower end portion 20 to its upper end portion 18 and therefrom to the dispensing opening 8.

In order to guide the tail of web material from the web material storage section 16
20 towards the dispensing opening 8, the dispenser 2 comprises a guiding arrangement 27 arranged above the upper end portion 18 of the web material storage section 16 and a separation unit 28. Thus, the tail of web material extends upwardly from the stack of folded web material in the web material storage section 16, through the guiding arrangement 27 and via the separation unit 28 to the dispensing opening 8. The guiding
25 arrangement 27 comprises a nip arranged to frictionally engage with the tail of web material sufficient for preventing the tail of the web material from sliding downwards towards the stack of folded web material in the web material storage section 16.

In these embodiments, the dispensing arrangement 14 comprises the separation unit 28.
30 The separation unit 28 is adapted for separating a sheet of web material from a perforated web material. Thus, the separation unit 28 comprises a first roller 30 and a second roller 32. A passage is formed between the first and second rollers 30, 32. The first and second rollers 30, 32 are provided with protrusion elements being spaced along the first and second rollers 30, 32. Outer portions of the protrusion elements of the

respective rollers 30, 32 overlap with each other. Thus, an undulated passage is formed between the rollers 30, 32 and the undulated passage forms a friction nip, in which the first and second rollers 30, 32 engage frictionally with the web material passing there through. Due to the frictional engagement of the web material in the undulated passage, a sheet of web material may be separated from the tail of web material in the separation unit 28 along a perforation of the web material as a user pulls on the web material through the dispensing opening to dispense a sheet of web material. As an alternative to the separation unit 28, the dispensing arrangement 14 may comprise a serrated edge arranged in a vicinity of the dispensing opening 8.

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Figs. 3a and 3b illustrate the dispenser 2 of Figs. 1 and 2 with the displaceable portion 26 in the tilted loading position. In Fig. 3a the dispenser 2 is illustrated in a perspective view with the door 6 in the open position. Fig. 3b illustrates a cross section along the vertical direction 12 through the middle of the dispenser 2 (the door has been omitted).

The stack of folded web material has been omitted in Figs. 3a and 3b for clarity reasons. A rear side 50 of the dispenser 2 is arranged opposite to the door 6, seen along a horizontal direction 48 perpendicular to the vertical direction 12, when the door 6 is closed.

In the tilted loading position of the displaceable portion 26, the lower end portion 20 of the web material storage section 16 is positioned beside and below the upper end portion 18 of the web material storage section 16, seen along the vertical direction 12. Put differently, in the tilted loading position the lower end 20 is positioned farther away from the rear side 50 than in the dispensing position, seen along the horizontal direction 48. The displaceable portion 26 is upwardly pivotable in relation to the vertical direction 12. According to some embodiments, the displaceable portion 26 may be pivotable to an angle α of between 30 – 100 degrees from a downward direction along the vertical direction 12. In this manner the displaceable portion 26 is readily accessible to a user standing in front of the dispenser for replenishing the dispenser 2 with one or more packages of web material. In these embodiments the displaceable portion 26 is pivotable to an angle of approximately 90 degrees from the downward direction. When the displaceable portion 26 is arranged in the tilted loading position, the lower end portion 20 is easily reachable for replenishing the dispenser 2 with folded web material from a

bottom end of a stack of folded web material present in the web material storage section 16.

The web material storage section 16 comprises a fixed portion 34 above the
5 displaceable portion 26, seen along the vertical direction 12. The displaceable portion 26
comprises a transitional portion 36 forming a transition from the displaceable portion 26
to the fixed portion 34. When the displaceable portion 26 is positioned in the tilted
loading position, the transitional portion 36 forms a gradual transition from the
displaceable portion 26 to the fixed portion 34.

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Also in the tilted loading position the side elements 24 on the four sides of the web
material storage section 16 support the stack of folded web material. In the transitional
portion 36, one side element comprising a flexible plate 37 comprises a substantially
smooth surface 38 adapted to abut against the stack of folded web material. The flexible
15 plate 37 is arranged towards the rear side 50 of the dispenser 2 and thus, the stack of
folded web material may slide along the substantially smooth surface 38 when the stack
is pushed upwardly in the web material storage section 16 as the stack is replenished
from its bottom end. The flexible plate 37 is supported by at least one element 40
extending in a direction across the vertical direction 12. In the transitional portion 36, a
20 number of side elements 24', arranged substantially perpendicularly to the flexible plate
37, are pivotably linked to each other to permit upward pivoting of the displaceable
portion 26. Accordingly, a pivot axis 39 of the displaceable portion 26, seen as a whole,
is arranged at a distance from the displaceable portion 26.

25 The displaceable portion 26 may be biased towards the tilted loading position. In these
embodiments the dispenser 2 comprises two gas springs 42 arranged to bias the
displaceable portion 26 towards the tilted loading position.

When in the tilted loading position, a user may replenish the dispenser 2 with packages
30 of folded web material via a loading opening 62 arranged in a region of the lower end
portion 20. At least one of the side elements 24 of the displaceable portion 26 is
provided with a support surface 61. The support surface 61 is tilted together with the
displaceable portion 26 in the tilted loading position. Thus, a package of folded web
material placed in the displaceable portion 26 is supported by the support surface 61 in

the vertical direction 12 when the displaceable portion 26 is in the tilted loading position. The lower end portion 20 may be provided with a recess 64 for removing a packaging strip of a package of folded web material. Finally, the user may pivot the displaceable portion 26 back into the dispensing position by pushing against the displaceable portion 26 at the lower end portion 20.

Fig. 4 illustrates a portion of the displaceable portion 26 of the dispenser 2 illustrated in Figs. 1 – 3b. The dispenser 2 comprises a supporting arrangement 70 for supporting, at least temporarily, the stack of folded web material at a distance from the stack supporting surface 21. The displaceable portion 26 comprises the supporting arrangement 70. The stack of folded web material may be moved to a position, in which it is supported by the supporting arrangement 70 while a package of folded web material is placed in the displaceable portion 26 for replenishing the dispenser 2. The supporting arrangement 70 comprises two projection members 72, one on each side of the displaceable portion 26. The supporting arrangement 70 is movable between a support position in which the supporting arrangement 70 is arranged to support the stack of folded web material and a release position in which the supporting arrangement 70 is arranged to release the stack of folded web material. The support position of the supporting arrangement 70 is illustrated in Fig. 4. The two projection members 72 of the supporting arrangement 70 extend into the displaceable portion 26 in the support position for supporting the stack of folded web material. In the release position the two projection members 72 of the supporting arrangement 70 are retracted out of the displaceable portion 26 for releasing the stack of folded web material.

The displaceable portion 26 comprises an inner portion 74 and an outer portion 76. Each of the two projection members 72 is pivotably connected to the outer portion 76 and extends through a slot 78 in the inner portion 74. The projection member 72 is biased towards the support position. The inner and outer portions 74, 76 are arranged to move in relation to each other as the displaceable portion 26 is moved between the dispensing position and the tilted loading position and vice versa. As the inner portion 74 and the outer portion 76 are moved in relation to each other, the projection member 72 moves along the slot 78. At a lower end of the slot 78, the projection member 72 will abut against the inner portion 74 and pivot out of the slot 78, i.e. from the support position to the release position. Thus, the supporting arrangement 70 is arranged in the support

position at least when the displaceable portion 26 is arranged in the tilted loading position, and in the release position when the displaceable portion 26 is arranged in the dispensing position.

- 5 When the displaceable portion 26 is in the dispensing position, the projection members 72 will abut against the inner portion 74 at the lower end of the slot 78 and are thus, in a position pivoted out of the slot 78 and out of the interior of the displaceable portion 26, i.e. the displaceable portion 70 is in the release position. Accordingly, the supporting arrangement 70 is movable from the support position to the release position when the
10 displaceable portion 26 is displaced from the loading position to the dispensing position.

Alternatively, the supporting arrangement 70 may be manually movable from the support position to the release position. In such embodiments a user may move the supporting arrangement 70 to the release position prior to moving the displaceable portion 26 from
15 the tilted loading position to the dispensing position. In a further alternative embodiment the supporting arrangement 70 may be moved from the supporting position to the release position by the full weight of the stack of folded web material. In such embodiments the supporting arrangement 70 may support the weight of a portion of the stack of folded web material and/or the entire stack of folded web material when the
20 displaceable portion 26 is arranged in the tilted loading position. When the displaceable portion 26 is moved to the dispensing position, the full weight of the stack pushes the displaceable portion to the release position.

In alternative embodiments, the projection members 72 may be biased to the release
25 position and a mechanical arrangement may bring the projection members 72 into the support position when the displaceable portion 26 is brought into the tilted loading position.

As can be seen in Figs. 3a and 3b, the projection members 72 of the supporting
30 arrangement 70 are positioned in the slots 78 at a distance from the lower end portion 20 when the displaceable portion 26 is in the tilted loading position.

Fig. 5 illustrates a portion of a web material storage section 16 of a dispenser 2 according to embodiments. The dispenser 2 is arranged for dispensing a sheet of web

material from a stack of folded web material. The dispenser 2 comprises a housing inside which the web material storage section 16 is arranged. Parts of the dispenser 2 and the stack of web material have been omitted for clarity reasons. However, the dispenser 2 may in essence comprise the same features as the dispenser 2 discussed in connection with Figs. 1 – 3b. The difference between the Figs. 1 – 3b embodiments and the Fig. 5 embodiments lies in a lower section of the web material storage section 16. The differences will be elaborated on below.

The web material storage section 16 comprises a displaceable portion 26. The displaceable portion 26 is displaceable along a vertical direction 12 of the dispenser 2. The displaceable portion 26 is movable upwardly from a lower end portion 20 of the web material storage section 16. The displaceable portion 26 may for instance be pulled upwardly by a user pulling on a string 110. Gravity may return the displaceable portion 26 to the lower end portion 20.

The displaceable portion 26 comprises a stack supporting surface 21. The dispenser 2 comprises a supporting arrangement 70 for supporting, at least temporarily, the stack of folded web material at a distance from the stack supporting surface 21. In these embodiments the web material storage section 16 comprises the supporting arrangement 70. The supporting arrangement 70 comprises two projection members 72, one on each side of the web material storage section 16. Each projection member 72 has an elongated shape to reach partially underneath the stack of folded web material. The displaceable portion 26 is provided with recessions 112 on two sides of the stack supporting surface 21.

The two projection members 72 are pivotably suspended in the web material storage section. The supporting arrangement 70 is movable between a support position in which the supporting arrangement 70 is arranged to support the stack of folded web material and a release position in which the supporting arrangement 70 is arranged to release the stack of folded web material. The two projection members 72 of the supporting arrangement 70 extend into the web material storage section 16 in the support position for supporting the stack of folded web material, as illustrated in Fig. 5. In the release position the two projection members 72 of the supporting arrangement 70 are in a

position pivoted out of the web material storage section 16 for releasing the stack of folded web material.

In the support position, the projection members 72 are prevented from pivoting further downwardly than illustrated in Fig. 5. For example, part of each projection member 72 may abut against a non-shown element fixed to the web material storage section 16. Thus, the supporting arrangement 70 may support a stack of folded web material in the web material storage section 16 at a distance from the stack supporting surface 21. The projection members 72 are biased towards the support position. The recessions 112 of the displaceable portion 26 are sized such the projections members 72, when in the support position, may be located in the recessions 112 below the stack supporting surface 21. Furthermore, the recessions 112 of the displaceable portion 26 are sized such the projections members 72 may be permitted to pivot from the release position to the support position in the recessions 112.

The dispenser is replenished by a user with a package of folded web material in the following manner: The door of the dispenser is opened and a remaining stack of folded web material inside the web material storage section 16 is moved upwardly by the user pulling on the string 110. Thus, the stack being supported on the stack supporting surface 21 is lifted together with the displaceable portion 26. If not already in the release position, the projection members 72 are pivoted upwardly out of the interior of the web material storage section 16 to the release position by the stack being lifted. When a bottom end of the stack has passed the projection members 72, the projection members 72 pivot from the release position to the support position in the recessions 112. Now the displaceable portion 26 is lowered and the stack is supported by the supporting arrangement 70 at a distance from the stack supporting surface 21. The user places a package of folded web material on the stack supporting surface 21. The displaceable portion 21 is again moved upwardly. An upper side of the package of folded web material makes contact with a bottom side of the stack of folded web material being supported by the supporting arrangement 70. The displaceable portion 26 is further moved upwardly. Thus, the projection members 72 are pivoted into the release position by the package. After further upward movement the bottom end of the package of folded web material, now part of the stack of folded web material in the dispenser, has passed

the projection members 72, which projection members 72 again pivot from the release position to the support position in the recessions 112.

Further packages of folded web material are added to the stack until the web material storage section 16 is filled. When the web material storage section 16 is filled the bottom end of the last package of folded web material will not reach the supporting arrangement 70. Thus, the projection members 72 will not pivot from the release position to the support position. Instead the entire stack of folded web material will move downwardly together with the displaceable portion 26, the stack resting on the stack supporting surface 21.

In alternative embodiments the supporting arrangement 70 may comprise one or more further pairs of projection members 72. The pairs of projection members 72 may be arranged in the web material storage section 16 at a distance from each other along the vertical direction 12 above and/or below the projection members 72 illustrated in Fig. 5.

Fig. 6 illustrates a portion of a web material storage section 16 of a dispenser 2 according to embodiments. The dispenser 2 is arranged for dispensing a sheet of web material from a stack of folded web material. The dispenser 2 comprises a housing inside which the web material storage section 16 is arranged. Parts of the dispenser 2 and the stack of web material have been omitted for clarity reasons. Again, the dispenser 2 may in essence comprise the same features as the dispenser 2 discussed in connection with Figs. 1 – 3b. The difference between the Figs. 1 – 3b embodiments and the Fig. 6 embodiments lies in a lower section of the web material storage section 16. The differences will be elaborated on below.

The web material storage section 16 comprises a displaceable portion 26. The displaceable portion 26 is displaceable along a vertical direction 12 of the dispenser 2. The displaceable portion 26 is movable upwardly from a lower end portion 20 of the web material storage section 16. The displaceable portion 26 may for instance be pulled upwardly by a user pulling on a string 110. Gravity may return the displaceable portion 26 to the lower end portion 20.

The displaceable portion 26 comprises a stack supporting surface 21. The dispenser 2 comprises a supporting arrangement 70 for supporting, at least temporarily, the stack of folded web material at a distance from the stack supporting surface 21. In these embodiments the web material storage section 16 comprises the supporting
5 arrangement 70. The supporting arrangement 70 comprises two projection members 72, one on each side of the web material storage section 16. Each projection member 72 has an elongated shape to reach partially underneath the stack of folded web material.

10 The two projection members 72 are pivotably suspended in the web material storage section 16. Moreover, the projection members 72 are arranged to move upwardly along the vertical direction 12 together with the displaceable portion 26. Accordingly, the projection members 72 are pivotably and movably suspended in the web material storage section 16, e.g. along two tracks 114.

15 The supporting arrangement 70 is movable between a support position in which the supporting arrangement 70 is arranged to support the stack of folded web material and a release position in which the supporting arrangement 70 is arranged to release the stack of folded web material. The two projection members 72 of the supporting arrangement
20 70 extend into the web material storage section 16 in the support position for supporting the stack of folded web material. In the release position the two projection members 72 of the supporting arrangement 70 are in a position pivoted away from the stack of folded web material for releasing the stack of folded web material.

Figs. 7a – 7c illustrate the displaceable portion 26 and the supporting arrangement 70 of
25 Fig. 6 during replenishing a relevant dispenser 2. In the following reference is made to Figs. 6 – 7c.

Each projection member 72 comprises a first end 116 and a second end 118 arranged on opposite sides of a pivot axis 120. The first end is arranged to project underneath the
30 stack 82 of folded web material and the second end 118 arranged to abut against a wall of the web material storage section 16. In the support position, the first ends 116 of the projection members 72 are prevented from pivoting further downwardly than illustrated in Figs. 7b by the second ends 118 abutting against, and frictionally engaging with, the wall of the web material storage section 16. Thus, the supporting arrangement 70 may

support a stack 82 of folded web material in the web material storage section 16 at a distance from the stack supporting surface 21. Furthermore, since the second ends 118 of the projection members 72 may frictionally engage with the wall in more than one position, the supporting arrangement 70 is arranged to support the stack 82 of folded web material in at least two positions along the vertical direction 12 in the web material storage section 16.

The displaceable portion 26 is provided with recessions 112 on two sides of the stack supporting surface 21. The recessions 112 of the displaceable portion 26 are sized such the projections members 72, when in the support position, may be located in the recessions 112 below the stack supporting surface 21. Furthermore, the recessions 112 of the displaceable portion 26 are sized such the projections members 72 may be permitted to pivot from the release position to the support position in the recessions 112. The projection members 72 are biased towards the support position.

The dispenser is replenished by a user with a package of folded web material in the following manner:

- The door of the dispenser is opened and a remaining stack 82 of folded web material inside the web material storage section 16 is moved upwardly by the user pulling on the string 110. Thus, the stack 82 being supported on the stack supporting surface 21 is lifted together with the displaceable portion 26 in the web material storage section 16, see Fig. 7a. The supporting arrangement 70 is also arranged to move upwardly along the vertical direction 12 together with the displaceable portion 26. More specifically, the projection members 72 are lifted together with the displaceable portion 26, the projection members 72 sliding with their pivot axes 120 along tracks 114.
- When the stack 82 has been lifted to a desired position in the web material storage section 16, the displaceable portion 26 is lowered. The weight of the stack 82 is now supported by the supporting arrangement 70 by the first ends 116 of the projection members 72 abutting against a bottom surface 122 of the stack 82 and the second ends 118 of the projection members 72 engaging frictionally with the wall of the web material storage section 16. Thus, the supporting arrangement 70 is arranged to engage with the web material storage

- section 16 above the lower end portion 20. The stack 82 is supported by the supporting arrangement 70 at a distance from the stack supporting surface 21.
- The user places a package 96 of folded web material on the stack supporting surface 21.
- 5 - The displaceable portion 26 is again moved upwardly. An upper side 124 of the package 96 of folded web material makes contact with the projection members 72. As the displaceable portion is further lifted, the projection members 72 are pivoted into the release position by the package 96, see Figs. 7b and 7c.
- 10 Accordingly, the supporting arrangement 70 is arranged to be disengaged from the web material storage section 16 by the package 96 of folded web material being moved upwardly along the vertical direction 12 with the displaceable portion 26. The upper side 124 of the package 96 makes contact with the bottom side 122 of the stack 82 of folded web material. Thus, the package 96 has been added to the stack 82.
- 15 - In the release position, gravity causes the projection members 72 to slide downwardly along the tracks 114, see Fig. 7c.
- On their way downwards, the projection members 72 are stopped by the displaceable portion 26. Upon being stopped, the projection members 72 pivot in the recessions 112 to the support position, see Fig. 7a.
- 20 - The displaceable portion 26 is now lowered and the weight of the stack 82 is again supported by the supporting arrangement 70, as explained above.
- Further packages 96 of folded web material are added to the stack 82 until the web material storage section 16 is filled.
- 25 When the web material storage section 16 is filled and the last package 96 has been added to the stack 82, the projection members 72 will follow the displaceable portion 26 back to the bottom end portion 20 of the web material storage section 16. Also the entire stack 82 of folded web material will move downwardly together with the displaceable portion 26, resting on the stack supporting surface 21. The projection members 72 will
- 30 follow the displaceable portion 26 because the second ends 118 of the projection members 72 do not engage frictionally with the wall of the web material storage section 16. The frictional engagement with the wall is avoided by the wall being provided with a recess 126 towards the lower end portion 20 of web material storage section 16. Thus, the second ends 118 do not reach the wall.

Fig. 8a illustrates schematically a cross section through a stack 82 of folded web material according to embodiments. The stack 82 is adapted for being positioned in a web material storage section 16 of a dispenser 2 disclosed herein. A tail 84 of web material from the stack 82 is arranged to extend from the stack 82 to a dispensing arrangement 14 of a relevant dispenser 2. The web material in the stack 82 of folded web material is a continuous web material which is Z-folded in an accordion-like manner. The web material comprise a first web layer 86 divided into sheet products defined between longitudinally separated lines of weakness 88 extending across the first web layer 86. The web material further comprise at least one second web layer 90 divided into sheet products defined between longitudinally separated lines of weakness 92 extending across the second web layer 90. The first and second web layers 86, 90 are interfolded so that the lines of weakness 88 of the first web layer 86 are offset from the lines of weakness 92 of the second web layer 90 in a longitudinal direction of the first web layer 86. Each folded section of first and second web layers 86, 90 forms a panel 93. At one end or at both ends of the stack 82, the stack 82 is provided with an adhesion arrangement 94 for interconnecting the folded web material of the stack 82 with that of a package of folded web material replenishing the stack 82 and the relevant dispenser 2.

Alternatively, the stack 82 of folded web material may only comprise the first web layer 86, which may be divided into sheet products defined between longitudinally separated lines of weakness extending across the first web layer 82. Further alternative stacks of folded web material may comprise one or more web layers which are not provided with lines of weaknesses, i.e. a non-perforated web material. For such a web material the dispenser 2 may suitably be provided with a dispensing arrangement 14, which comprises a cutting or tearing arrangement.

Fig. 8b illustrates a package 96 of folded web material according to embodiments. The package 96 is arranged to be placed in a dispenser 2 as disclosed herein. The package 96 is held together by a packaging strip 98. The packaging strip 98 may be removed by pulling on a release tab 99 of the packaging strip 98. The folded web material of the package 96 may be a folded web material as discussed in connection with the stack 82 illustrated in Fig. 6a. The package 96 comprises two creased sides, the creased side 100 and the opposite non-visible side of the package 96. On one or both panel end surfaces 102, 104 of package 96, the package 96 is provided with an adhesion

arrangement 94'. By means of the adhesion arrangement 94', the package 96 of folded web material may be attached to the bottom end of a stack 82 of folded web material in a dispenser 2 as disclosed herein.

- 5 The adhesion arrangement 94, 94' illustrated in Figs. 6a and 6b may e.g. comprise strips or patches of a hook and loop fastening arrangement or dabs or patches of glue.

Figs. 9a – 9e illustrate a method of replenishing a dispenser 2 with a package 96 of folded web material. The dispenser 2 may be a dispenser 2 as described in connection with Figs. 1 – 4. Only the displaceable portion 26 of the dispenser 2 in the tilted loading position has been shown for clarity reasons. A package 96 of folded web material, which has been placed in the dispenser 2 to replenish the same, forms part of a stack of folded web material inside the dispenser 2.

- 15 Fig. 9a illustrates a package 96 of folded web material held together by a packaging strip 98 ready to be placed in the displaceable portion 26 via the loading opening 62 to abut against the support surface 61. The loading opening 62 is arranged in the displaceable portion 26 such that the package 96 of folded web material is inserted in a direction transverse to a longitudinal extension of the displaceable portion 26. Fig. 9b illustrates
- 20 the package 96 of folded web material placed in the displaceable portion 26 abutting with a creased side of the package 96 against the support surface 61. The package 96 is thus supported by the support surface 61 in the vertical direction 12 by the support surface 61. Figs. 9c-9d illustrate the packaging strip 98 being removed from the package 96. The packaging strip 98 is removed by pulling on the release tab 99. The packaging
- 25 strip 98 is removed via the recess 64 in the lower end portion 20. Fig. 9e illustrates the package 96 being pushed upwardly in the displaceable portion 26. During pushing, the package 96 slides along the support surface 61. The projection members 72 of the supporting arrangement 70 prevent the package 96, now part of a stack of folded web material in the dispenser 2, from sliding back towards the loading opening 62. A further
- 30 package of folded web material may be placed in the dispenser 2 via the loading opening 62.

Panel end surfaces 102, 104 of the package 96 and the further package are provided with an adhesion arrangement 94 for attaching the web material of the two packages to

each other. Thus, a continuous web material may be provided between the two packages, and thus also in the stack in the dispenser 2.

Fig. 9a' illustrates an alternative lower end portion 20 of a dispenser 2 according to
5 embodiments and the replenishing of the dispenser 2 with a package 96 of folded web material. The lower end portion 20 comprises two bottom elements 22. The bottom elements 22 are foldable into the displaceable portion 26. A loading opening 62 for the package 96 is thus formed. The loading opening 62 is arranged in the displaceable portion 26 such that a package 96 of folded web material is inserted in a direction along
10 a longitudinal extension of the displaceable portion 26. Via the loading opening 62 the package 96 is placed in the displaceable portion 26 to abut against the support surface 61. Once the package 96 has been pushed into the displaceable portion 26 beyond the folded bottom elements 22, the bottom elements 22 return to their initial position, illustrated in Fig. 9a'. In the initial position, and when the displaceable portion is arranged
15 in the dispensing position, the bottom elements 22 are arranged to support the stack of folded web material inside the dispenser 2 and thus, prevent the stack from sliding out through the loading opening 62. A side element 24 of the displaceable portion 26 at the lower end portion 20 is provided with the recess 64 for grasping and/or removing the packaging strip 98 from the package 96. The packaging strip 98 may alternatively be
20 removed at the bottom elements 22, i.e. substantially in the direction along the longitudinal extension of the displaceable portion 26.

The packaging strip 98 may be held together e.g. by a glue or by welding. By pulling on the release tab 99 of the packaging strip 98 the seal provided by the glue may be
25 broken, or the packaging strip 98 may rupture, e.g. along a perforation provided therein. A force required to pull the packaging strip 96 from the dispenser 2 in the direction along the longitudinal extension of the displaceable portion 26, e.g. via the recess 64, may be between 6 – 15 N.

30 Example embodiments described above may be combined as understood by a person skilled in the art. Although the invention has been described with reference to example embodiments, many different alterations, modifications and the like will become apparent for those skilled in the art. Therefore, it is to be understood that the foregoing is

illustrative of various example embodiments and that the invention is defined only the appended claims.

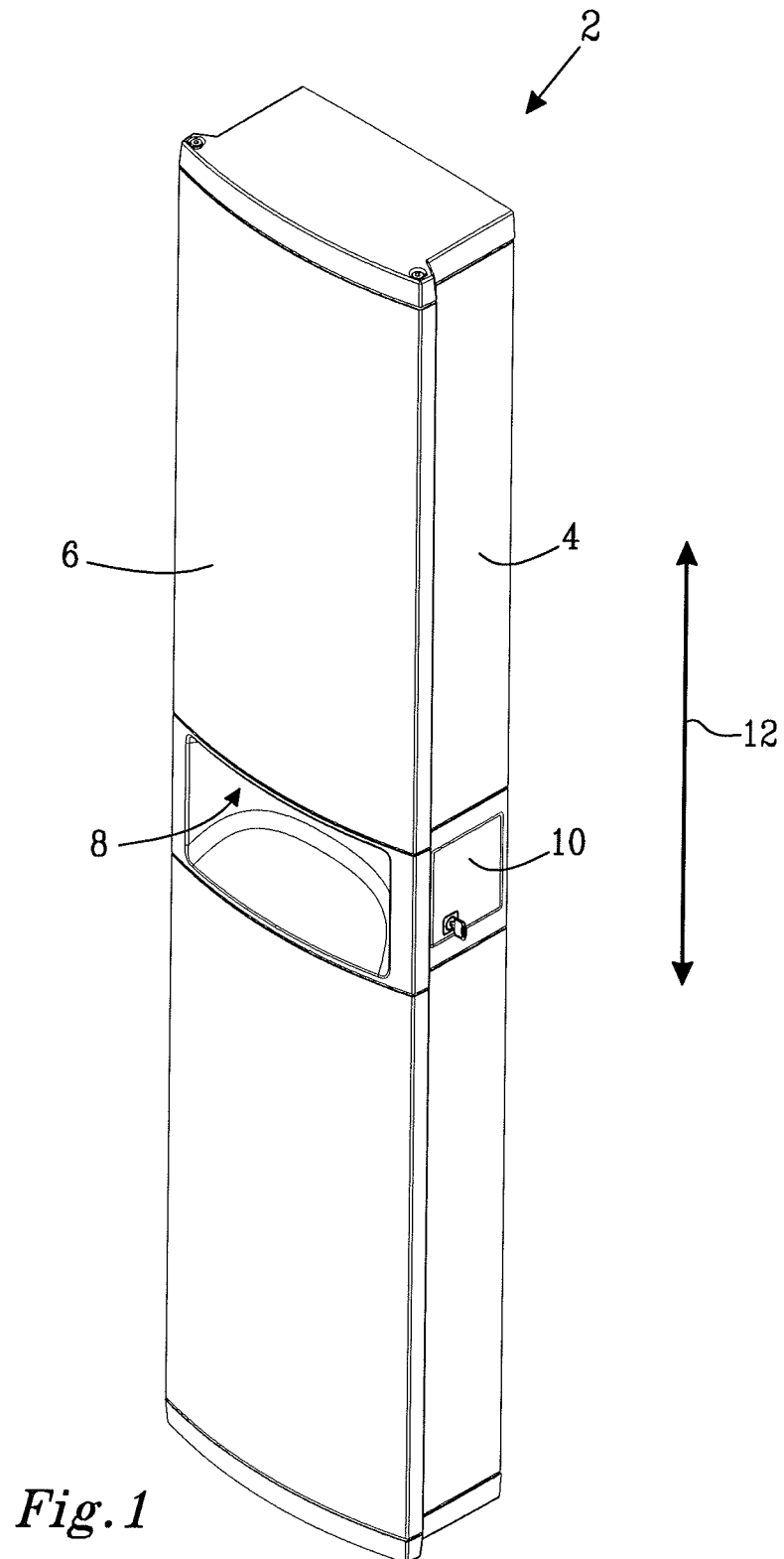
5 As used herein, the term "comprising" or "comprises" is open-ended, and includes one or more stated features, elements, steps, components or functions but does not preclude the presence or addition of one or more other features, elements, steps, components, functions or groups thereof.

CLAIMS

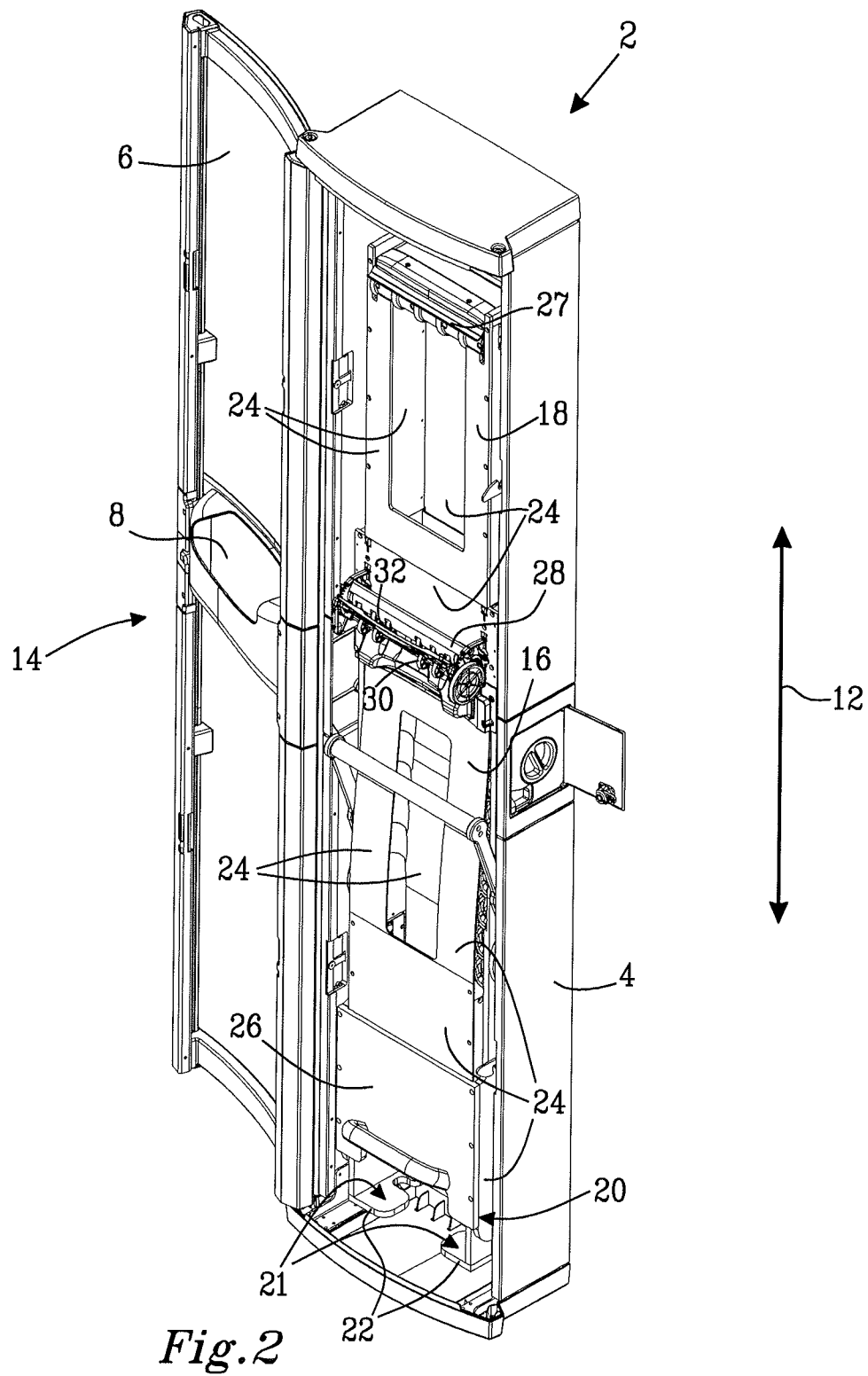
1. A dispenser (2) for dispensing a sheet of web material from a stack (82) of folded web material, the dispenser (2) comprising: a housing (4) arranged to be positioned along a vertical direction (12), a dispensing arrangement (14) including a dispensing opening (8) for the web material in the housing (4), and a web material storage section (16) inside the housing (4) arranged to hold and support the stack (82) of folded web material, the web material storage section (16) comprising, seen along the vertical direction (12), an upper end portion (18) and opposite thereto a lower end portion (20), and a stack supporting surface (21), wherein the web material is arranged to be lead to the dispensing arrangement (14) from the upper end portion (18) and the stack (82) of folded web material is arranged to be supported by the stack supporting surface (21),
characterized in that,
the dispenser (2) comprises a supporting arrangement (70) for supporting, at least temporarily, the stack (82) of folded web material at a distance from the stack supporting surface (21).
2. The dispenser (2) according to claim 1, wherein the dispensing opening (8) is arranged above the lower end portion (20), seen along the vertical direction (12).
3. The dispenser (2) according to claim 1 or 2, wherein the dispenser (2) is arranged for dispensing web material from a top of the stack (82) of folded web material.
4. The dispenser (2) according to any one of the preceding claims, wherein the supporting arrangement (70) is movable between a support position in which the supporting arrangement (70) is arranged to support the stack (82) of folded web material and a release position in which the supporting arrangement (70) is arranged to release the stack (82) of folded web material.
5. The dispenser (2) according to any one of the preceding claims, wherein the supporting arrangement (70) is arranged to support the stack (82) of folded web material, at least temporarily, in at least two positions along the vertical direction (12) in the web material storage section (16).

6. The dispenser (2) according to any one of the preceding claims, wherein the web material storage section (16) comprises a displaceable portion (26).
7. The dispenser (2) according to claim 6, wherein the displaceable portion (26) comprises the lower end portion (20) and the stack supporting surface (21), and wherein the lower end portion (20), seen along the vertical direction (12), is arranged substantially underneath the upper end portion (18) when the displaceable portion (26) is arranged in a dispensing position, and wherein the displaceable portion (26) is displaceable from the dispensing position to a tilted loading position, in which tilted loading position the lower end portion (20) is positioned beside and below the upper end portion (18), seen along the vertical direction (12).
8. The dispenser (2) according to claims 4 and 7, wherein the supporting arrangement (70) is movable from the support position to the release position when the displaceable portion (26) is displaced from the loading position to the dispensing position.
9. The dispenser (2) according to claim 6, wherein the displaceable portion (26) comprises the stack supporting surface (21) and the displaceable portion (26) is displaceable along the vertical direction (12).
10. The dispenser (2) according to claim 9, wherein the supporting arrangement (70) is arranged to move upwardly along the vertical direction (12) together with the displaceable portion (26).
11. The dispenser (2) according to claim 10, wherein the supporting arrangement (70) is arranged to engage with the web material storage section (16) above the lower end portion (20).
12. The dispenser (2) according to claim 11, wherein the supporting arrangement (70) is arranged to be disengaged from the web material storage section (16) by a package (96) of folded web material being moved upwardly along the vertical direction (12) with the displaceable portion (26).

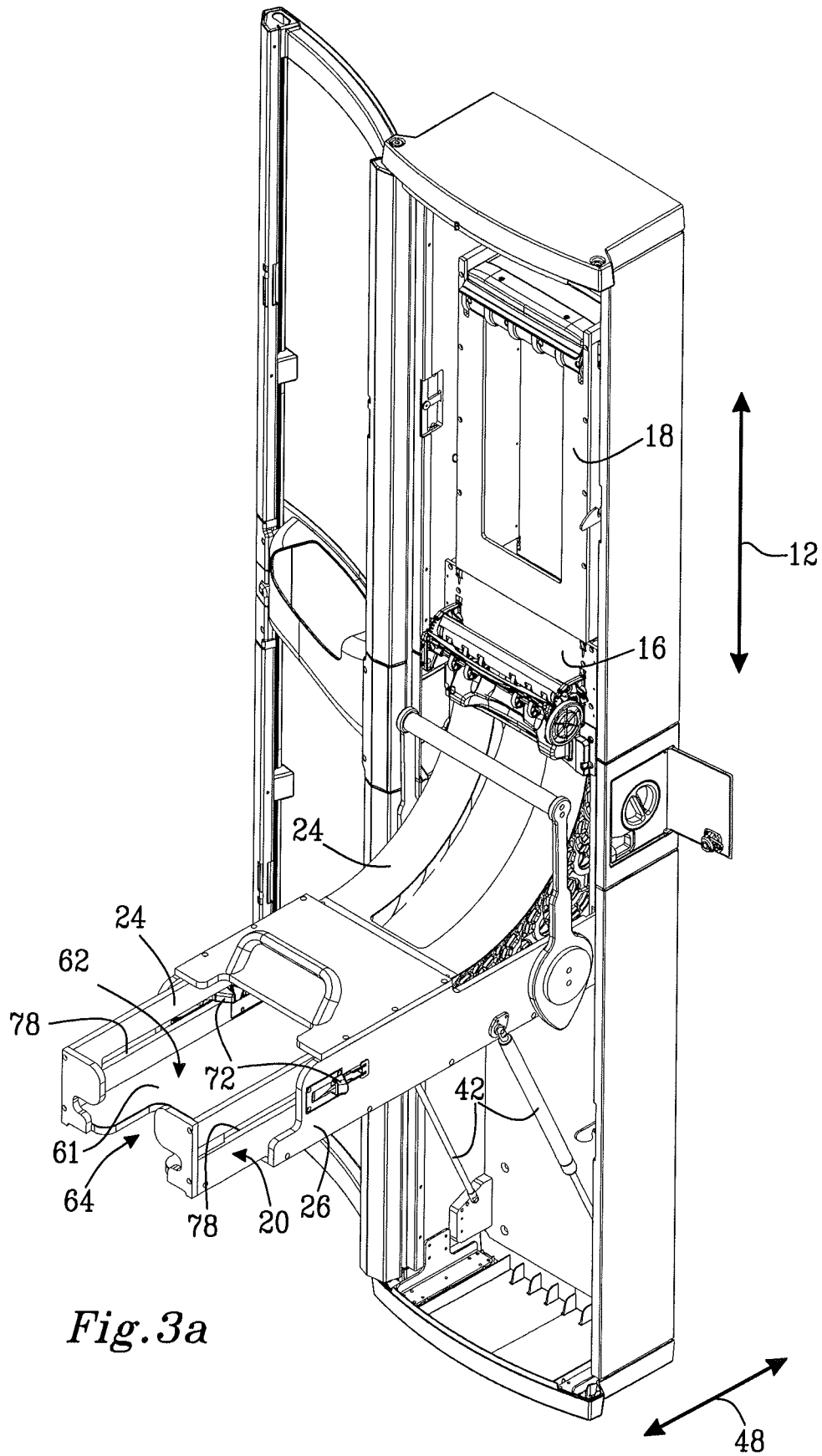
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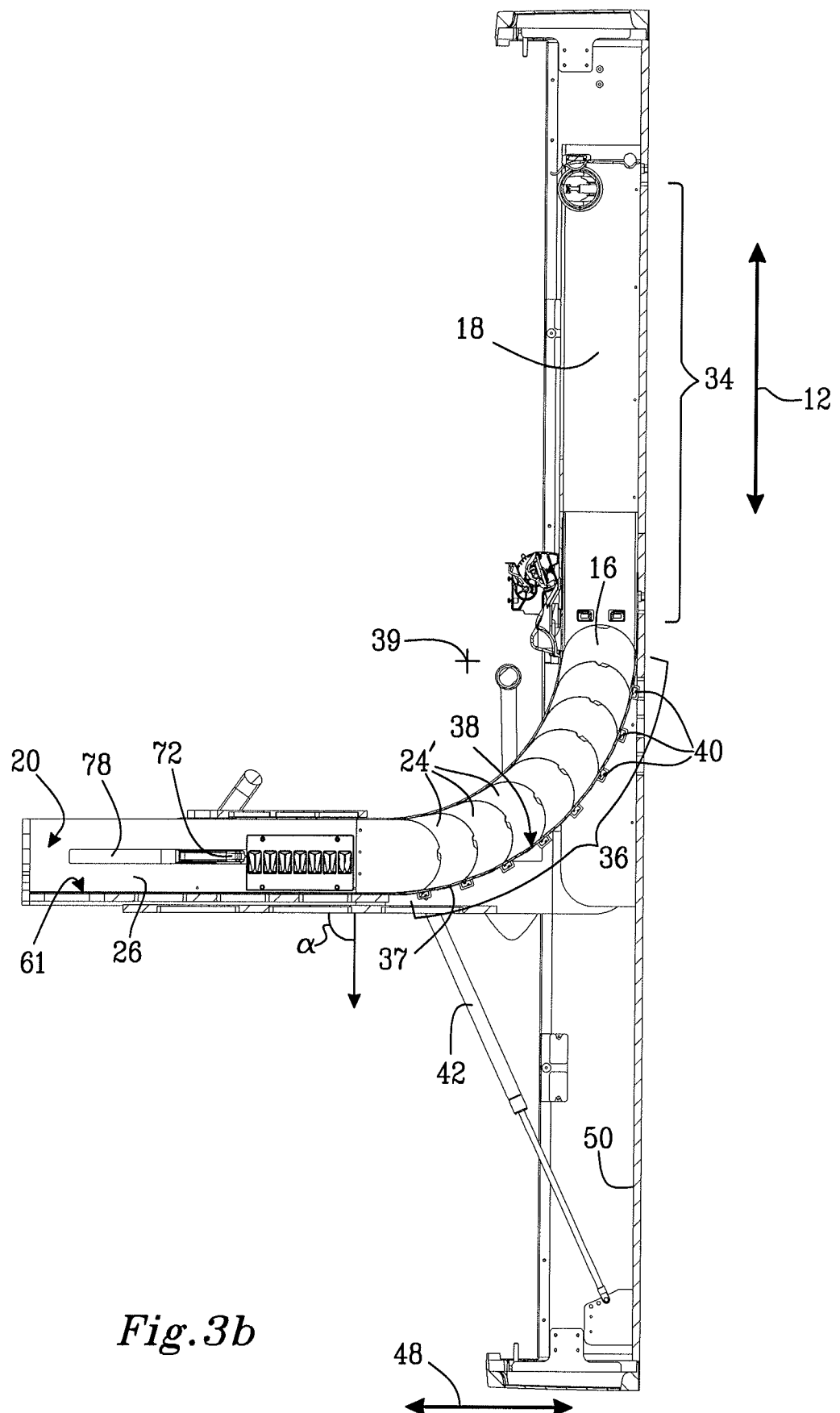
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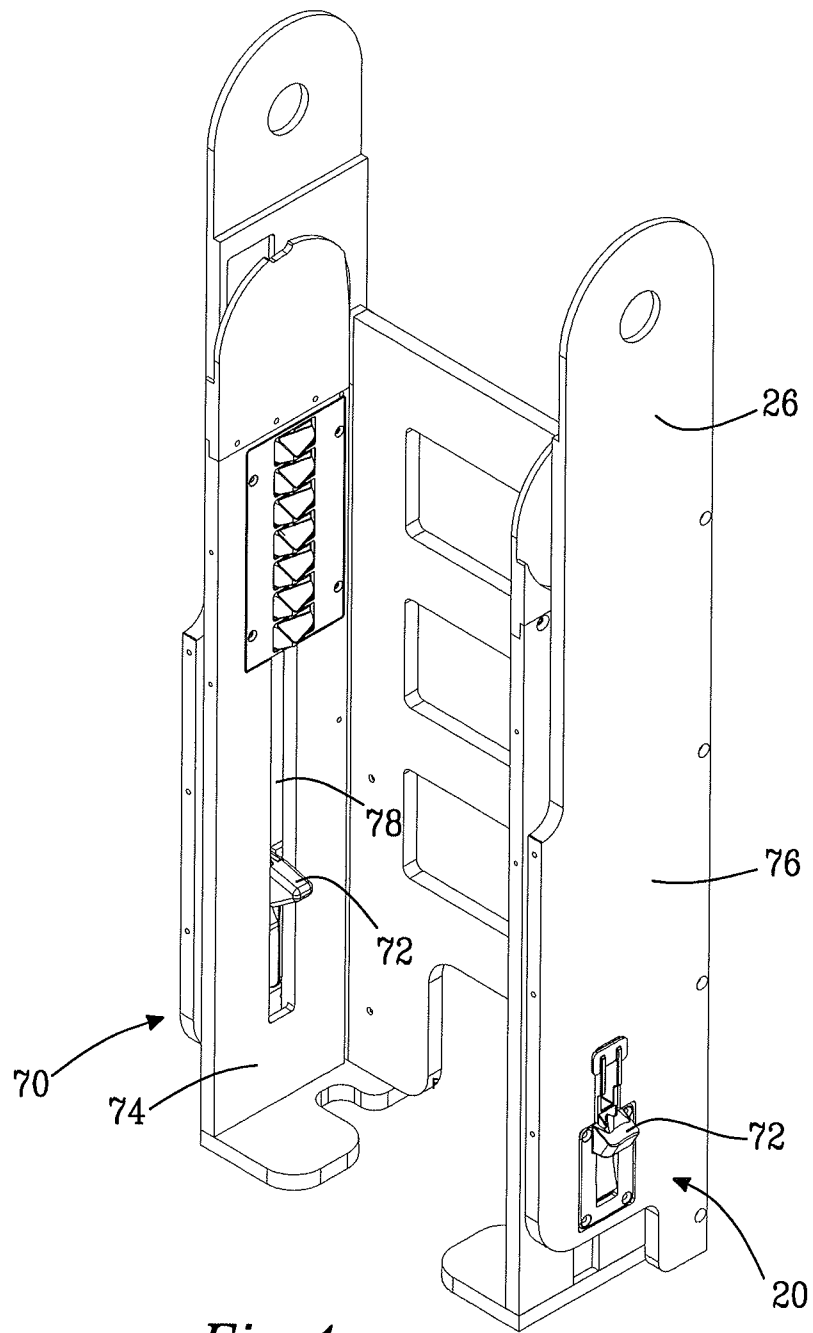


Fig. 4

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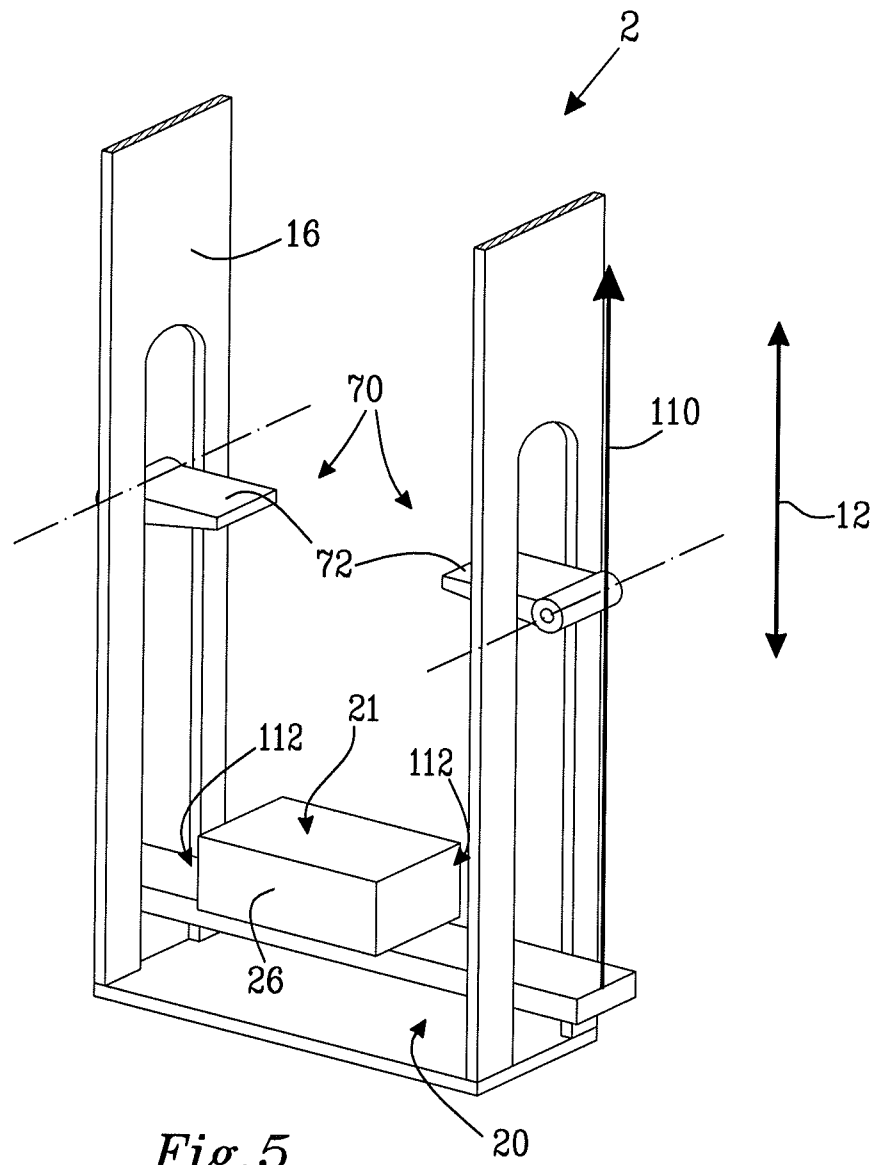


Fig. 5

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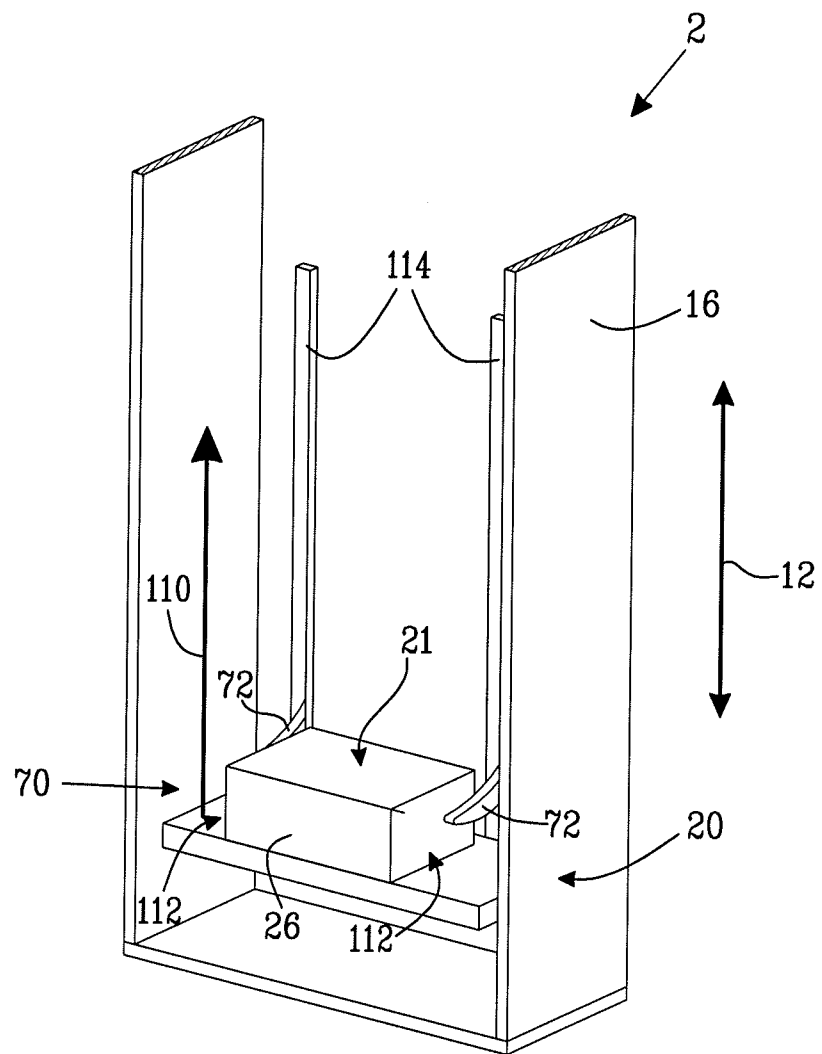


Fig. 6

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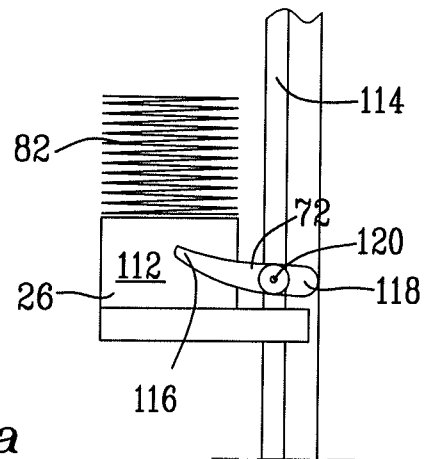


Fig. 7a

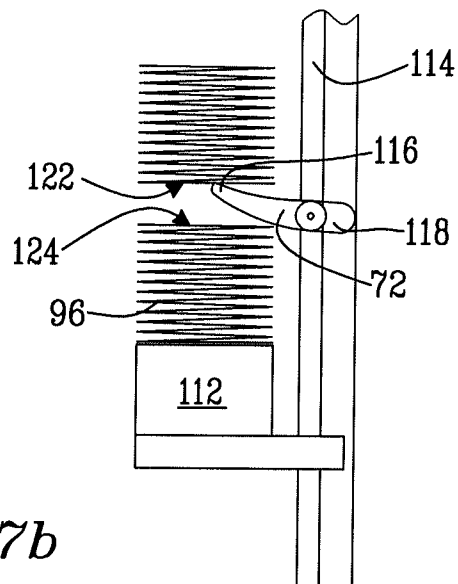


Fig. 7b

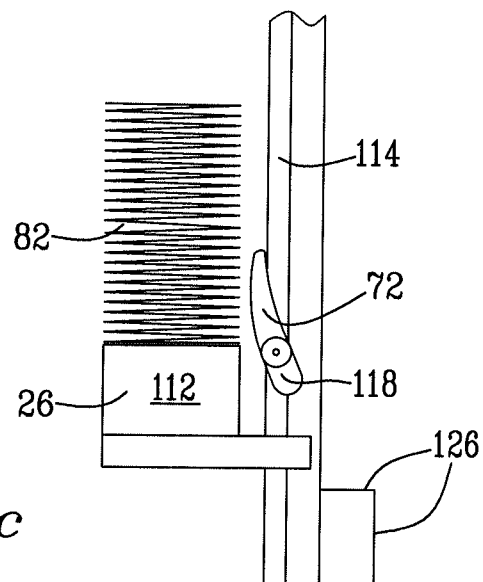


Fig. 7c

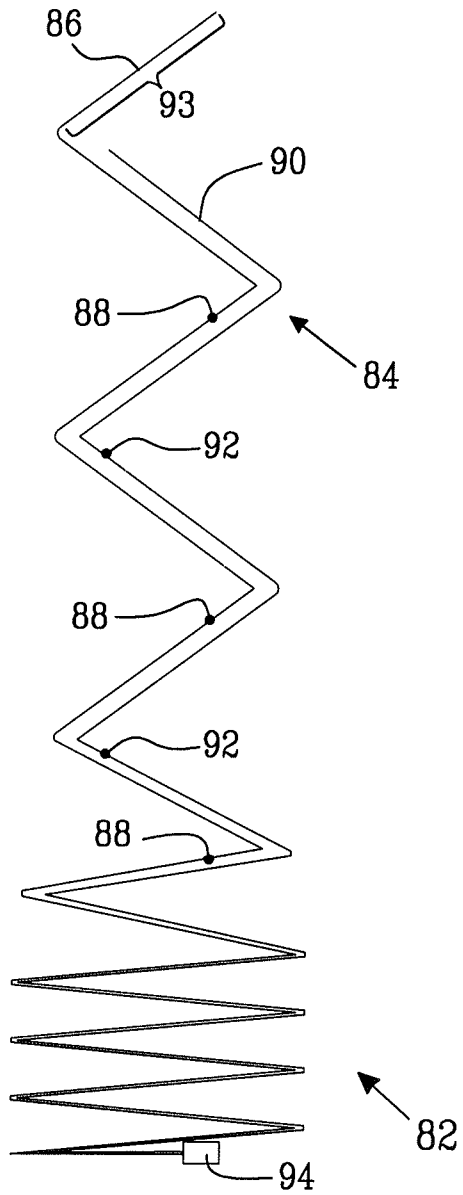


Fig. 8a

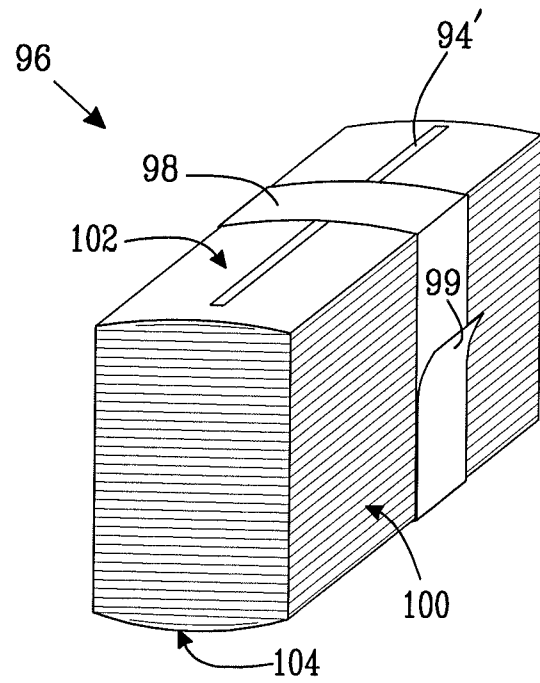
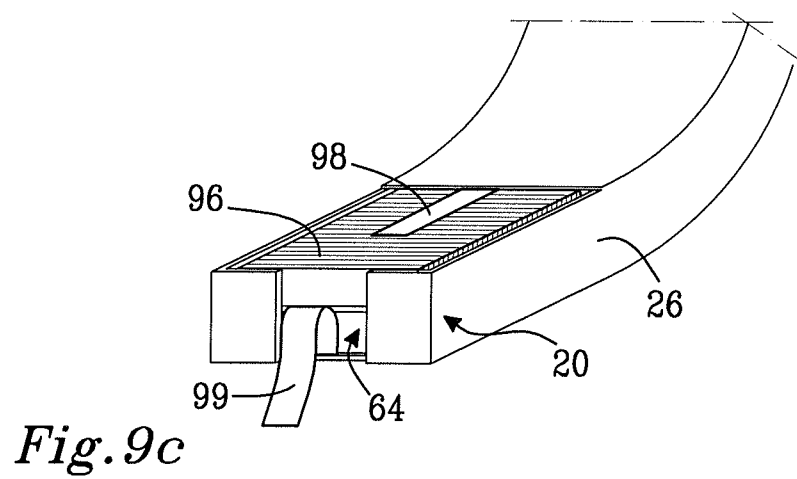
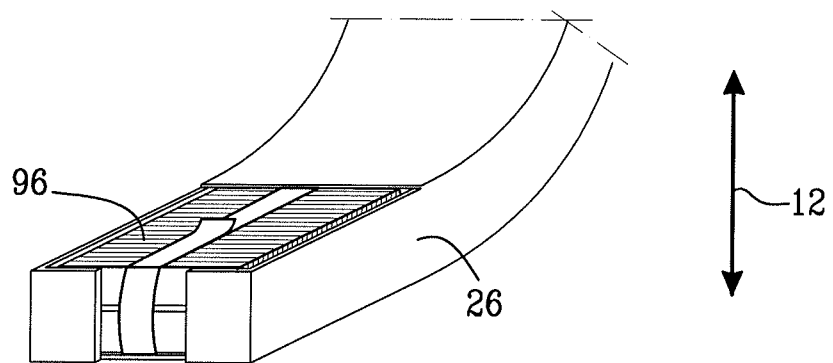
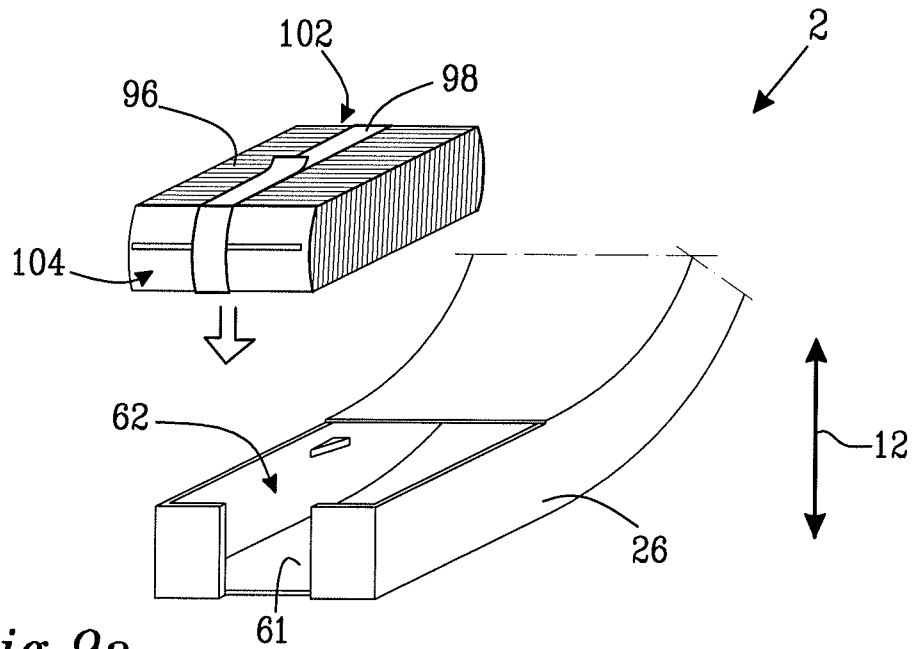
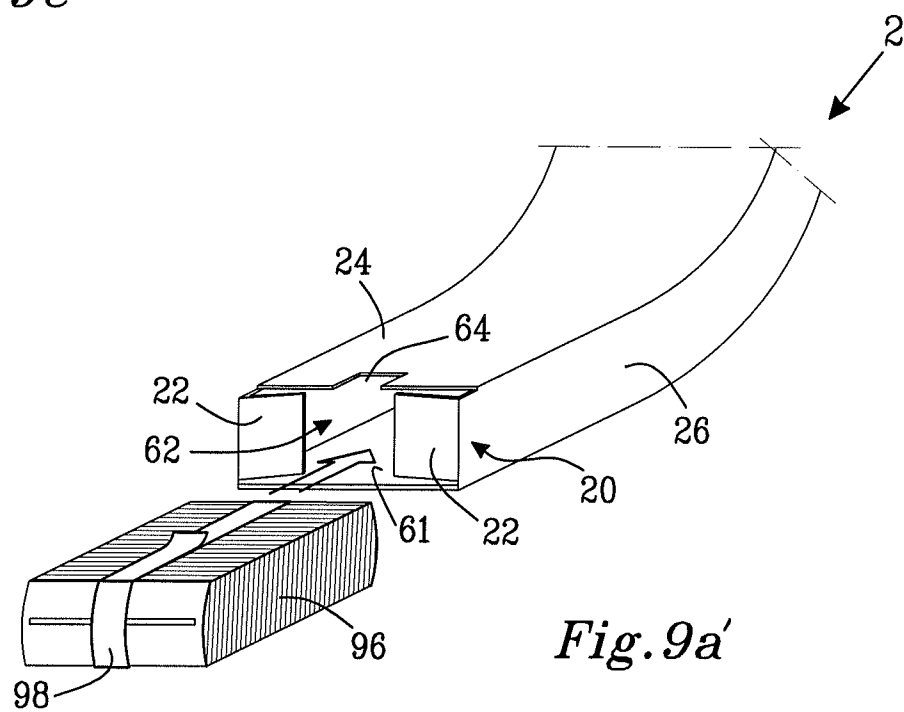
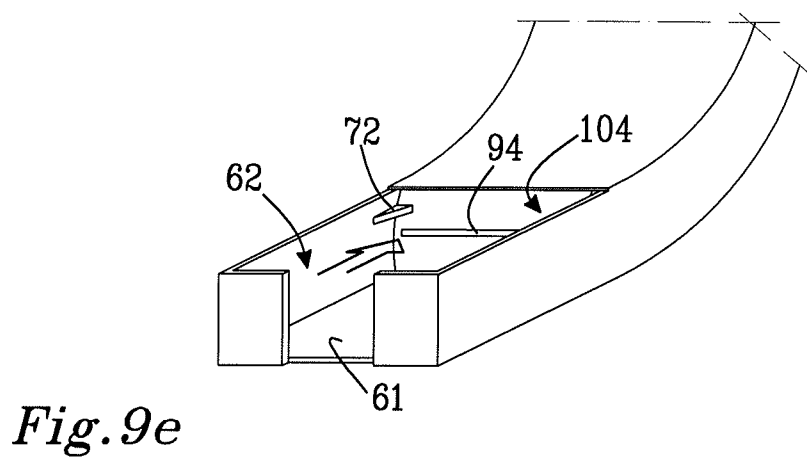
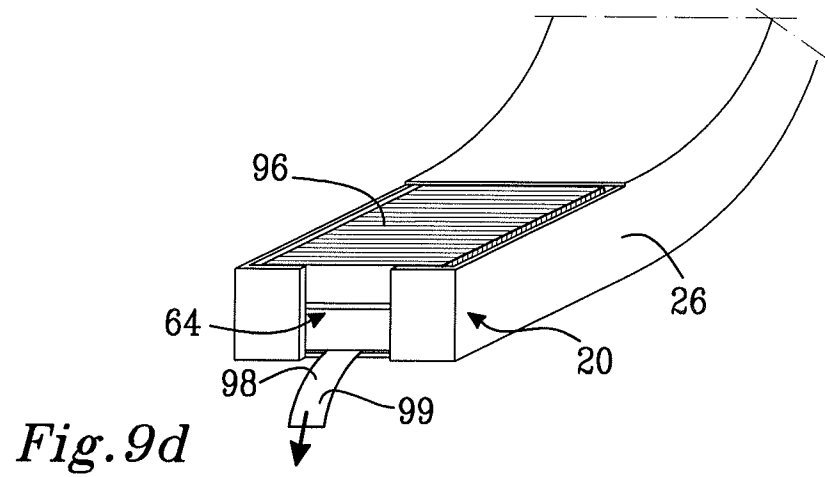


Fig. 8b

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11/11



INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2012/051439

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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)

IPC: A47K

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)

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 20110210137 A1 (KLING ROBERT), 1 September 2011 (2011-09-01); abstract; figures --	1-12
A	US 1681840 A (CARLSON ALVIN E), 21 August 1928 (1928-08-21); whole document --	1-12
A	US 20110101020 A1 (GRANGER MAURICE), 5 May 2011 (2011-05-05); abstract; figures --	1-12

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

17-09-2013

Date of mailing of the international search report

18-09-2013

Name and mailing address of the ISA/SE

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2012/051439

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 2809082 A (MARCUSE MOSES M), 8 October 1957 (1957-10-08); whole document --	1-12
A	US 5642836 A (MERRIWEATHER JR FRANK), 1 July 1997 (1997-07-01); abstract; figures -- -----	1

Continuation of: second sheet**International Patent Classification (IPC)****A47K 10/42** (2006.01)**A47K 10/34** (2006.01)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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