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(54) **MODULAR MULTI-SEGMENT TRAY,
CARRYING ELEMENT AND MODULAR
TRAY INSERT**

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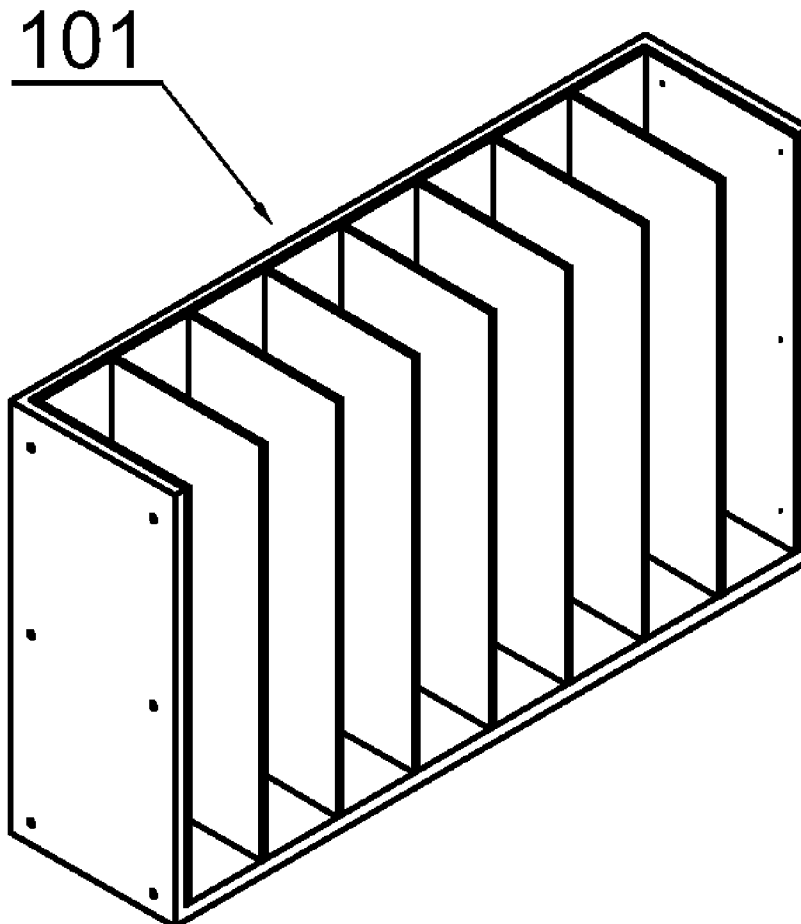
(57) **ABSTRACT**

(22) PCT Filed: **Apr. 16, 2012**

The object of the application is a modular multi-segment tray (101) for use in the tobacco industry for conveying rod-shaped articles, characterized in that it comprises a carrying element (102), a multi-segment insert (103) and fastening means (112, 113, 114) adapted to join the carrying element (102) and the multi-segment insert (103), as well as a multi-segment insert and a carrying element for such tray.

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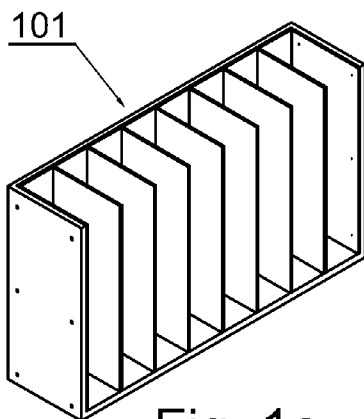


Fig. 1a

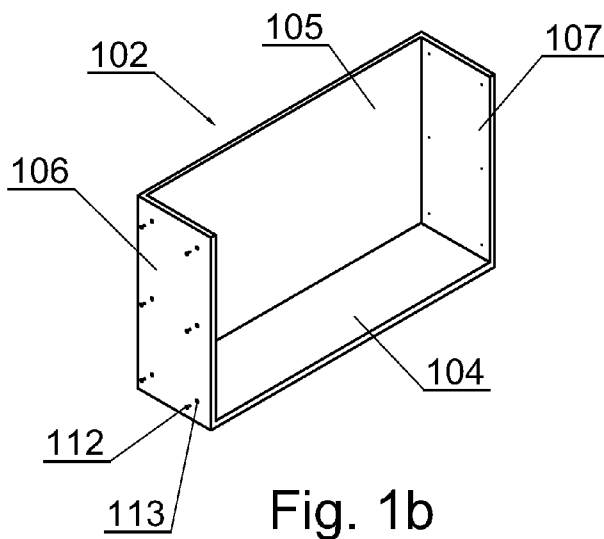


Fig. 1b

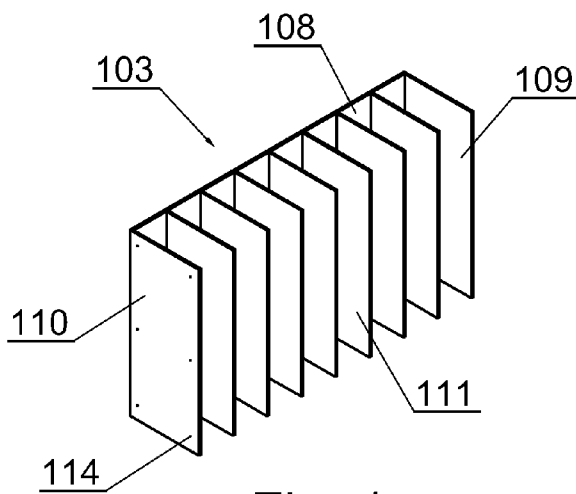


Fig. 1c

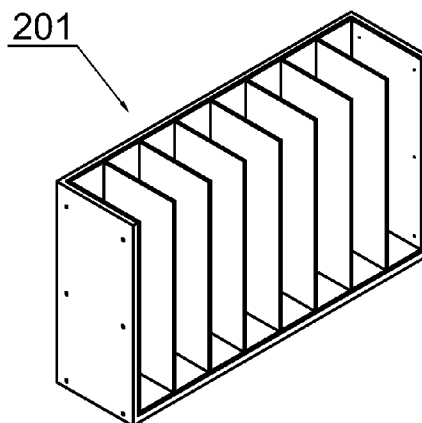


Fig. 2a

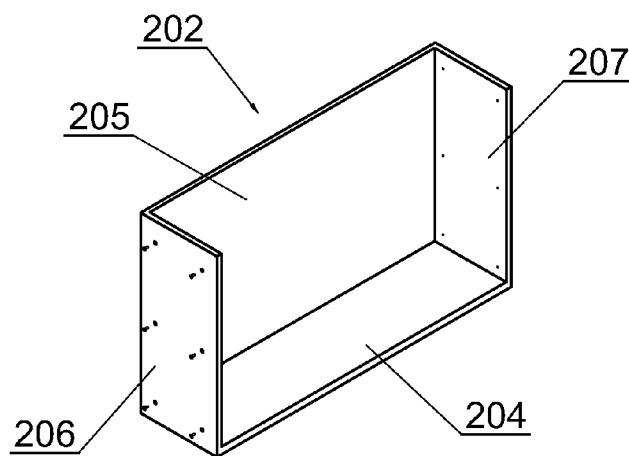


Fig. 2b

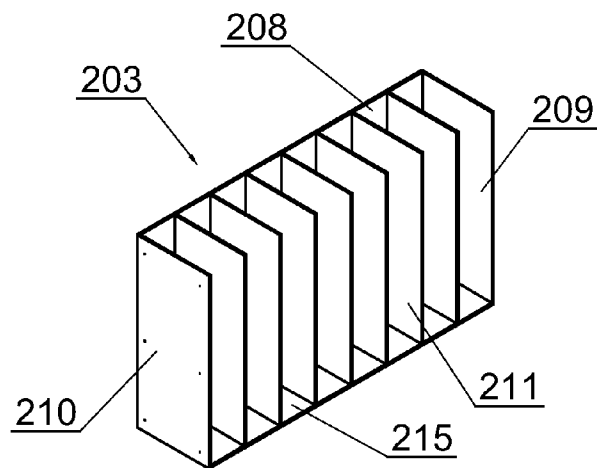


Fig. 2c

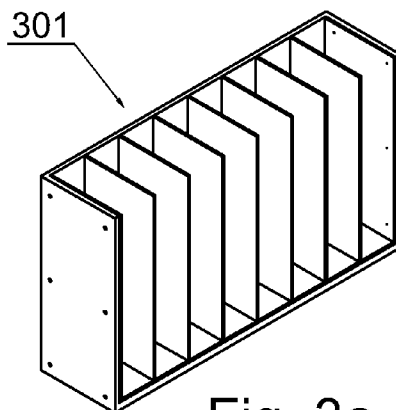


Fig. 3a

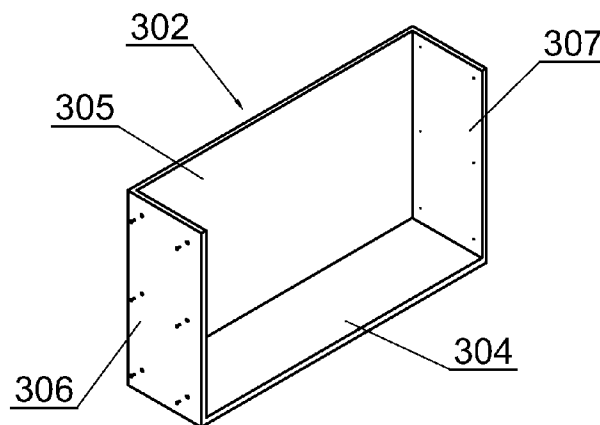


Fig. 3b

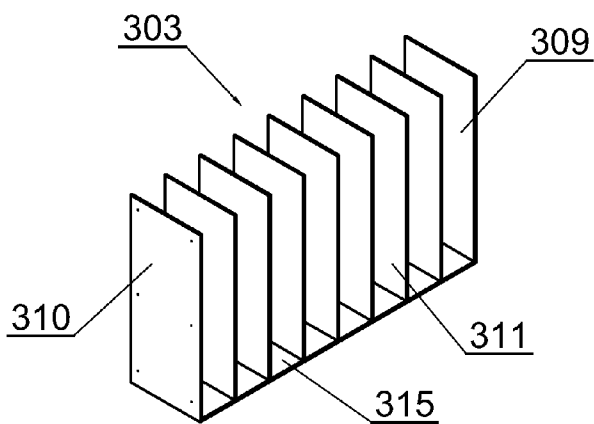


Fig. 3c

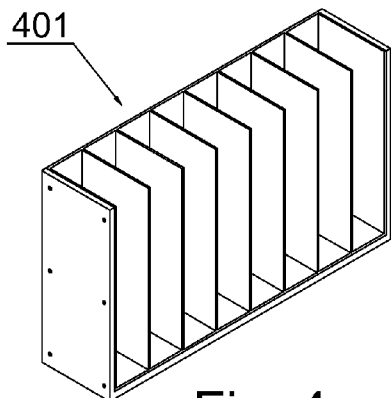


Fig. 4a

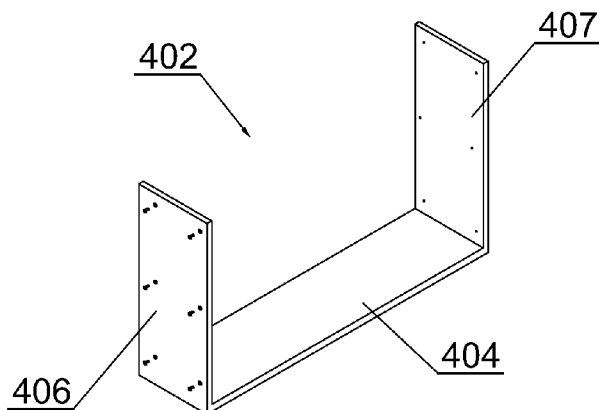


Fig. 4b

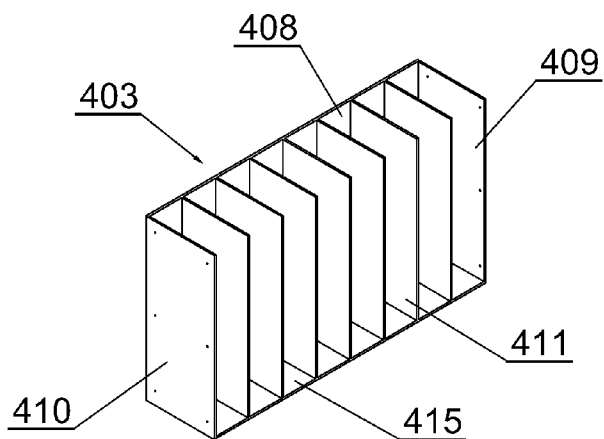


Fig. 4c

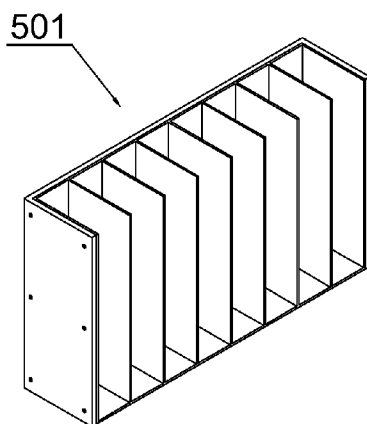


Fig. 5a

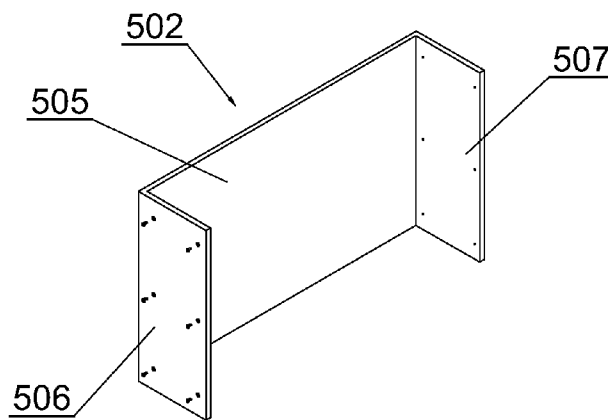


Fig. 5b

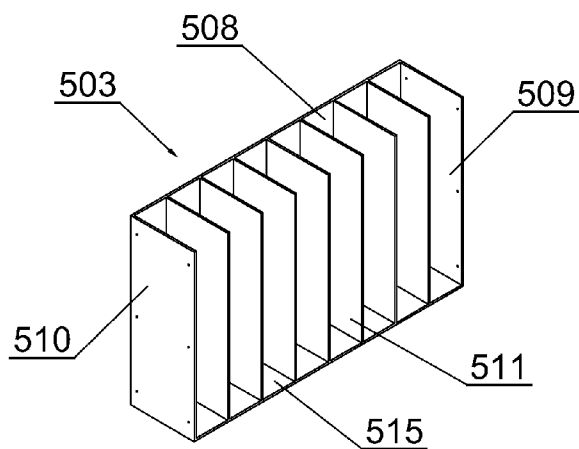


Fig. 5c

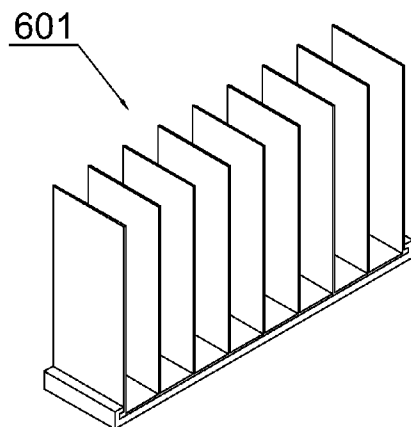


Fig. 6a

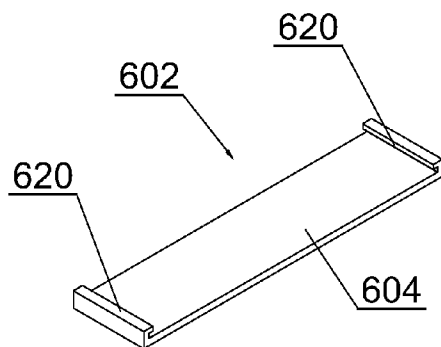


Fig. 6b

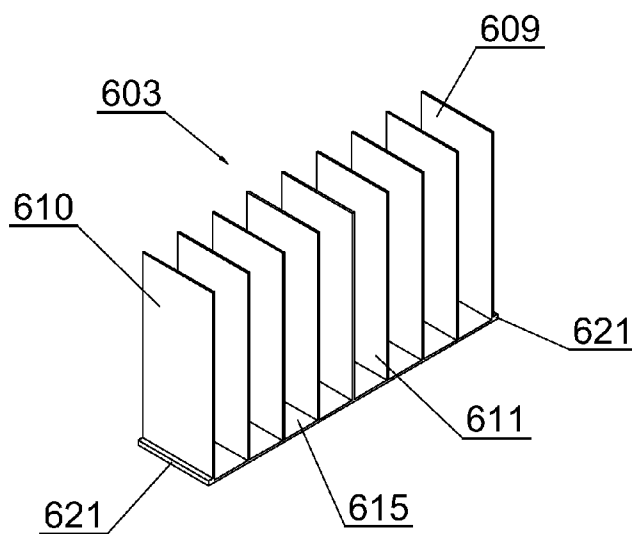
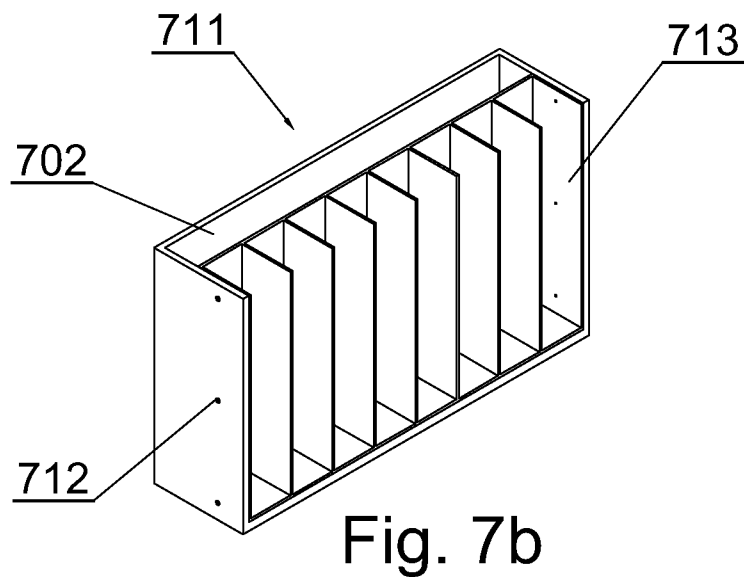
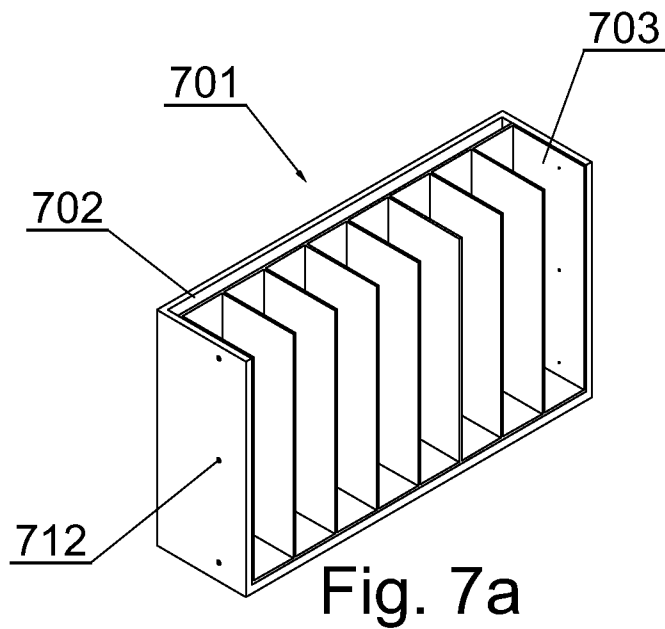


Fig. 6c



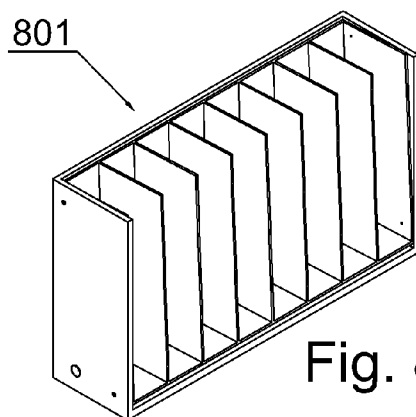


Fig. 8a

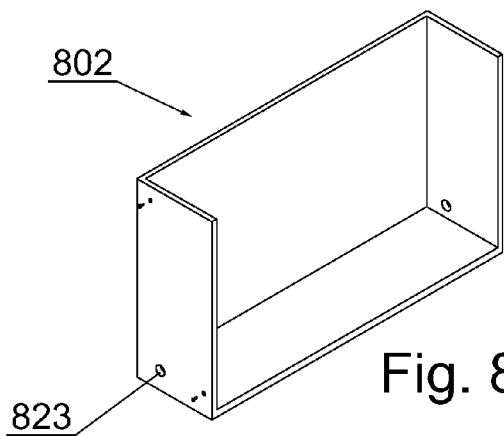


Fig. 8b

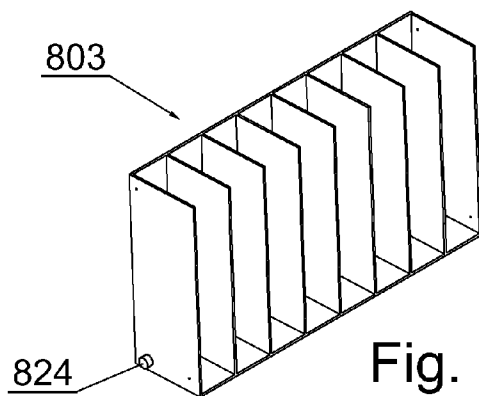


Fig. 8c

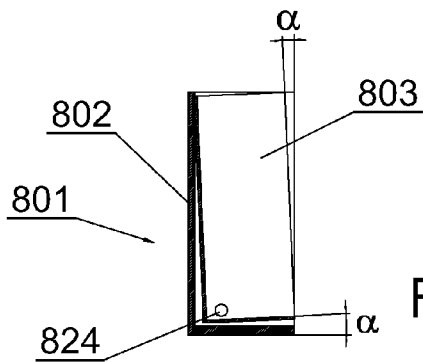
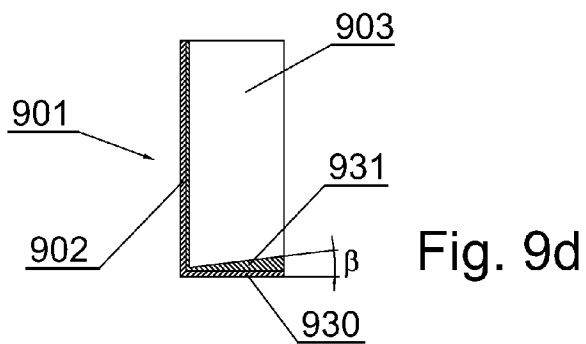
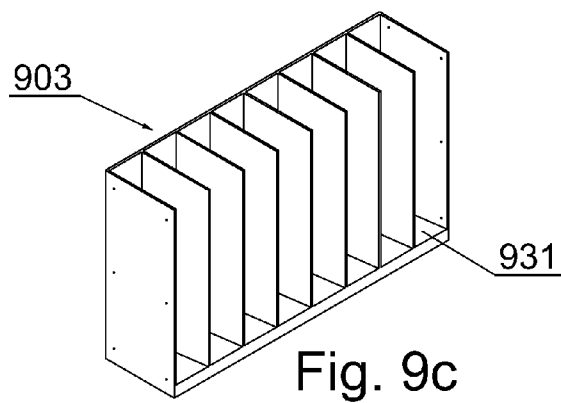
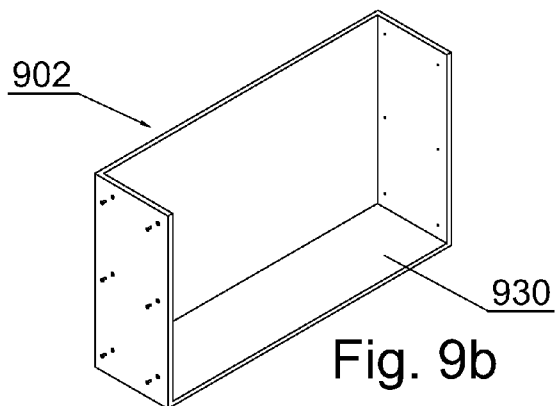
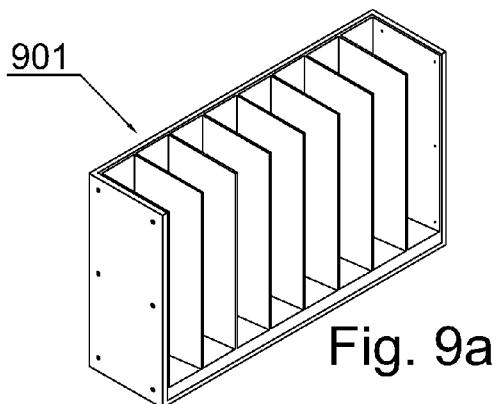


Fig. 8d



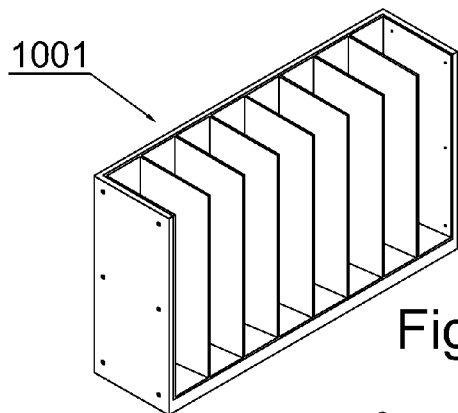


Fig. 10a

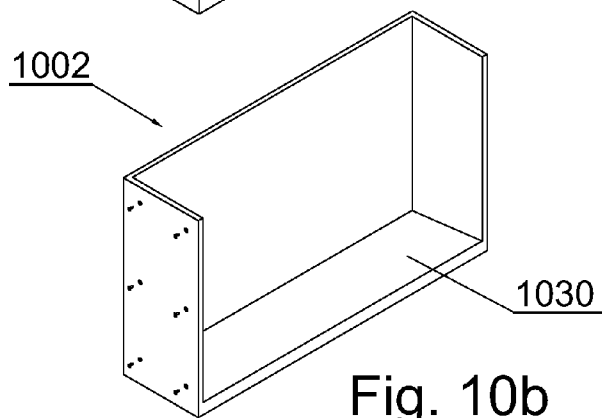


Fig. 10b

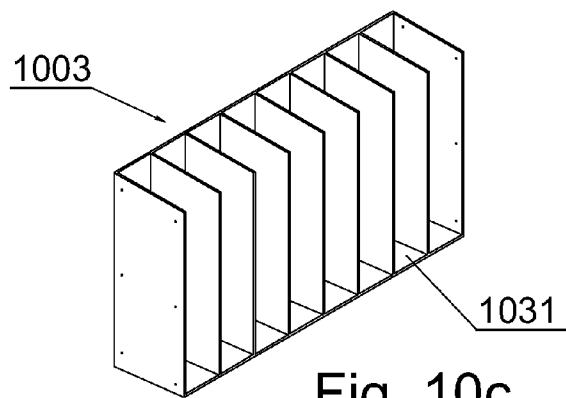


Fig. 10c

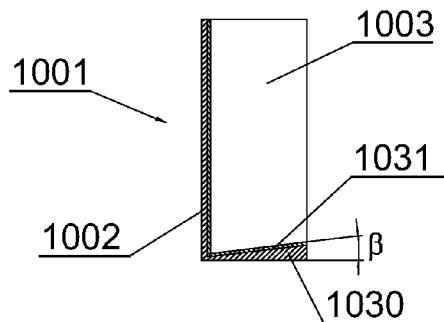


Fig. 10d

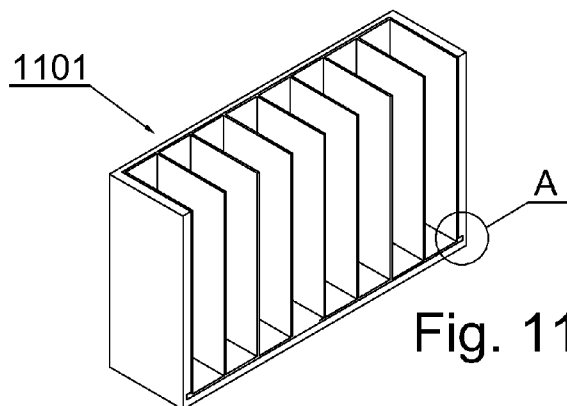


Fig. 11a

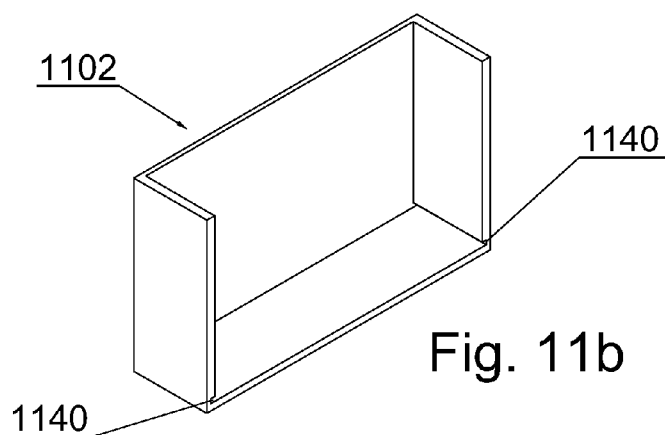


Fig. 11b

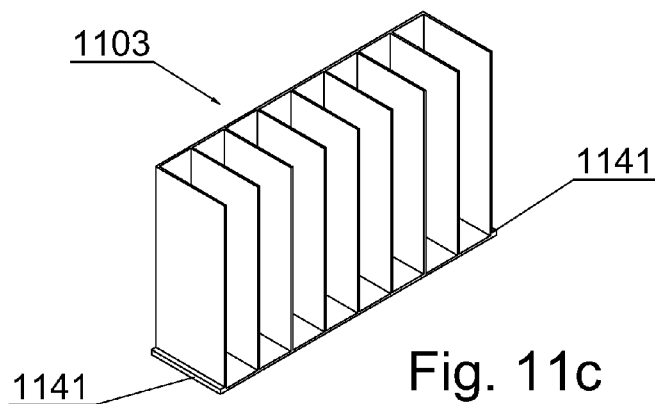


Fig. 11c

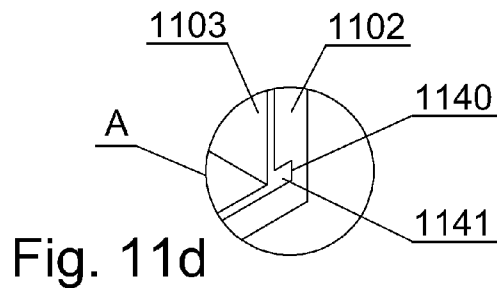


Fig. 11d

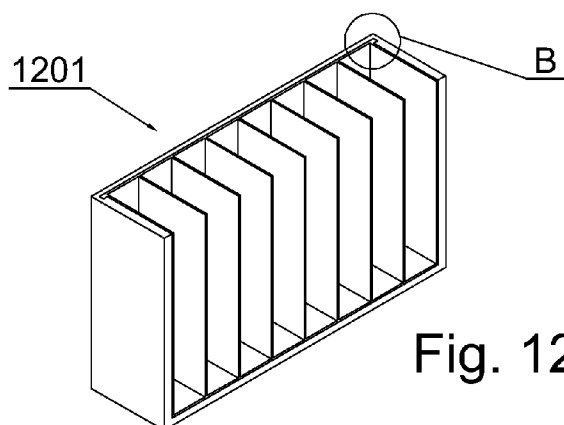


Fig. 12a

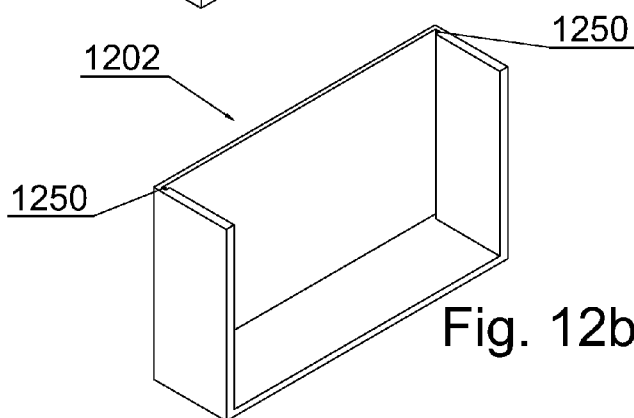


Fig. 12b

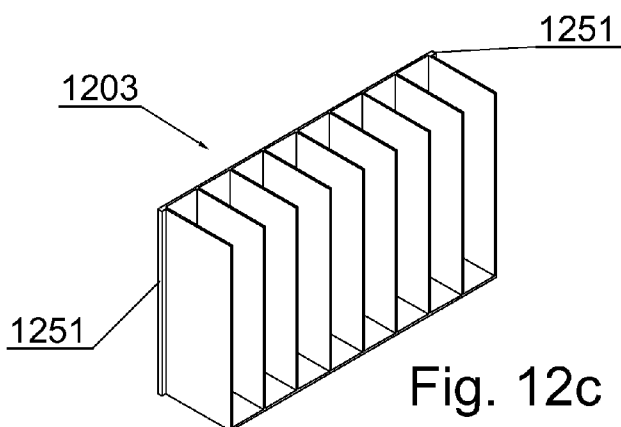


Fig. 12c

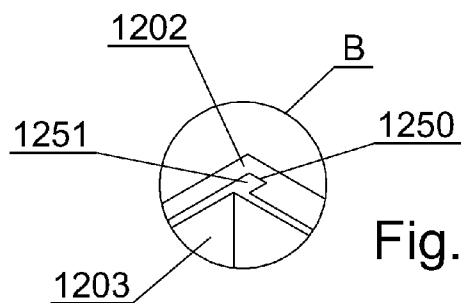
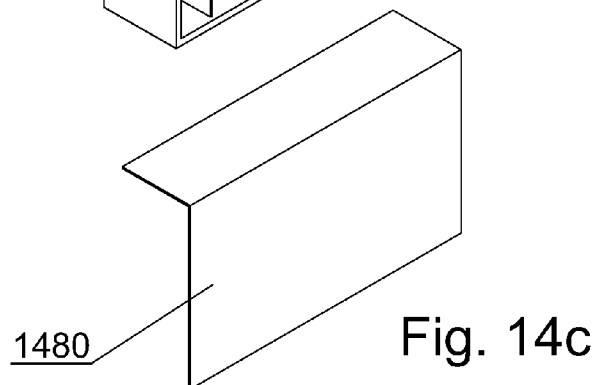
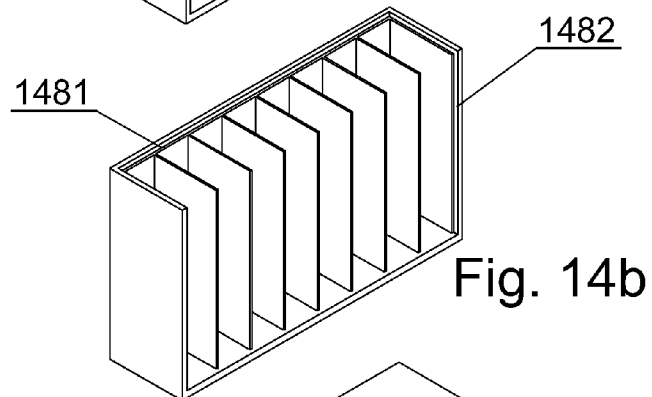
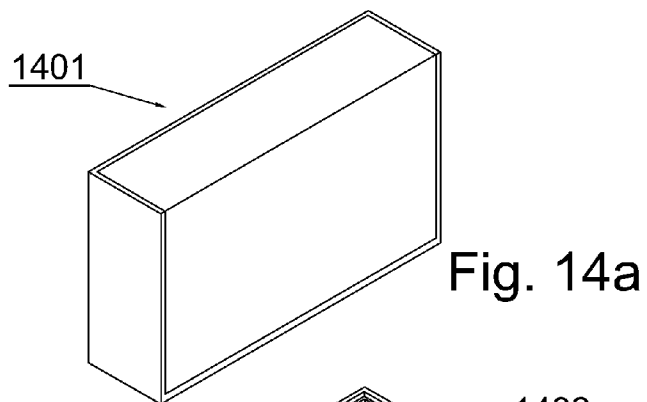
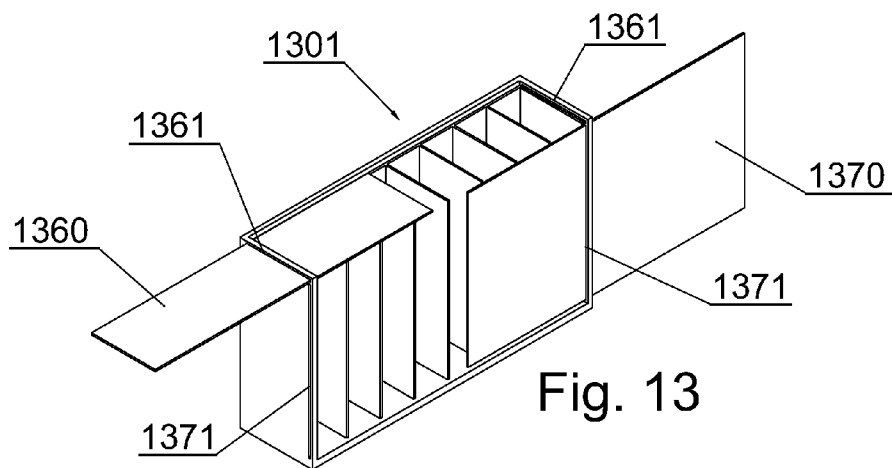


Fig. 12d



**MODULAR MULTI-SEGMENT TRAY,
CARRYING ELEMENT AND MODULAR
TRAY INSERT**

[0001] The object of the application is a modular multi-segment tray for storing and conveying rod-shaped articles of the tobacco industry, a carrying element and an insert constituting modules of the said tray.

[0002] In the tobacco industry, trays for storing and conveying among others cigarettes and filter rods are commonly used. The dimensional variety of rod-shaped articles encountered in the tobacco industry requires the use of many different trays adapted first of all to the length of the articles, but also to their shape. One chamber trays are commonly used in the industry, however, machines designed for the cooperation with multi-segment trays are encountered in the factories, which similarly to one chamber trays, depend on the specification/dimensions of stored articles. A multi-segment tray is provided with a plurality of partition walls constituting partitions between adjacent segments in which portions of rod-shaped articles are stored, whereas the partition walls are usually being evenly spaced inside the tray.

[0003] The utility model DE 19 15 446 U discloses a multi-segment tray in which the rear wall and the partition walls are permanently connected with each other, whereas the bottom of the tray is a sword-shaped element pushed into slots made in each of the walls. The patent GB 694,334 presents a tray having two side walls and a bottom to which two partition walls are attached. The publication EP 1 972 212 discloses a multi-segment tray in which the walls are mounted each separately to the housing of the tray, whereas the housing of the tray is provided with elements for receiving and/or fastening such walls.

[0004] The object of the present invention is to develop a modular multi-segment tray which will be easily adaptable to various products by replacing the insert of the tray, and leaving the carrying element unchanged.

[0005] The object of the invention is a modular multi-segment tray to be used in the tobacco industry for conveying rod-shaped articles. The tray comprises a carrying element, a multi-segment insert and fastening means adapted to join the carrying element and the multi-segment insert.

[0006] A modular tray according to the invention is characterized in that the fastening means are elements of a bolted, form-locked, glued or hinged joint.

[0007] A modular tray according to the invention is characterized in that the fastening means allow the adjustment of the angle of inclination of a multi-segment insert.

[0008] A modular tray according to the invention is characterized in that it is provided with protective covers and additional fastening elements for receiving the protective covers.

[0009] The object of the invention is also a carrying element of a modular multi-segment tray to be used in the tobacco industry for conveying rod-shaped articles. A carrying element of a modular multi-segment tray comprises at least one carrying wall provided with fastening means adapted to fasten a multi-segment insert in the carrying element.

[0010] A carrying element according to the invention is characterized in that it has a form of a one chamber tray provided with fastening means.

[0011] A carrying element according to the invention is characterized in that it has a form of a single bottom wall provided with fastening means.

[0012] A carrying element according to the invention is characterized in that it comprises side walls and a rear wall which are provided with fastening means. The fastening means are disposed either on the side walls or on the rear wall, or both on the side walls and the rear wall.

[0013] A carrying element according to the invention is characterized in that the carrying element comprises a bottom wall and side walls provided with fastening means. The fastening means are disposed either on the bottom wall or on the side walls, or both on the bottom wall and the side walls.

[0014] The object of the invention is also a multi-segment insert of a modular tray to be used in the tobacco industry for conveying rod-shaped articles. A multi-segment insert of a modular tray is characterized in that it comprises a set of interconnected partitions defining individual segments of the tray, where in addition the insert is provided with fastening means.

[0015] A multi-segment insert of a modular tray according to the invention is characterized in that a set of interconnected partitions defining individual segments of the tray is connected by means of a bottom wall.

[0016] A multi-segment insert of a modular tray according to the invention is characterized in that a set of interconnected partitions defining individual segments of the tray is connected by means of a bottom wall and a rear wall.

[0017] A multi-segment insert of a modular tray according to the invention is characterized in that a set of interconnected partitions defining individual segments of the tray is connected by means of a rear wall.

[0018] A multi-segment insert of a modular tray according to the invention is characterized in that a set of interconnected partitions defining individual segments of the tray has a depth adapted to the length of conveyed rod-shaped articles, in particular it has a depth smaller than the depth of a carrying element.

[0019] A multi-segment insert of a modular tray according to the invention is characterized in that the bottom of the insert or the bottom of the carrying element is set at an angle to the level.

[0020] The developed modular multi-segment tray provides the possibility of the use of different inserts adapted to various conveyed or stored articles. It is possible to use in one factory trays provided with carrying elements of one kind for all kinds of articles used, having different inserts. This allows to standardise gripping elements of the tray in manufacturing machines because the gripping elements usually grip the tray at side walls or the elements at which the tray is gripped are disposed on the side walls of the tray. In such situation, the stores and the machines cooperating with the stores can be adapted to only one specification of the carrying element. In addition, after the removal of the insert the carrying element can be used as a one chamber tray, which allows storing of articles within one store both in one-chamber and multi-segment way.

[0021] The object of the invention is shown in a preferred embodiment in a drawing in which:

[0022] FIG. 1*a*, 1*b*, 1*c*—show a modular multi-segment tray in a first embodiment in which the carrying element has the form of a one chamber tray, and the partition walls of the insert are connected by a rear wall;

[0023] FIG. 2*a*, 2*b*, 2*c*—show a modular multi-segment tray in a second embodiment in which the carrying element has the form of a one chamber tray, and the partition walls of the insert are connected by a rear wall and a bottom wall;

[0024] FIG. 3*a*, 3*b*, 3*c*—show a modular multi-segment tray in a third embodiment in which the carrying element has the form of a one chamber tray, and the partition walls of the insert are connected by a bottom wall;

[0025] FIG. 4*a*, 4*b*, 4*c*13 show a modular multi-segment tray in a fourth embodiment in which the carrying element has a bottom wall and side walls, and the partition walls of the insert are connected by a rear wall and a bottom wall;

[0026] FIG. 5*a*, 5*b*, 5*c*—show a modular multi-segment tray in a fifth embodiment in which the carrying element has a rear wall and side walls, and the partition walls of the insert are connected by a rear wall and a bottom wall;

[0027] FIG. 6*a*, 6*b*, 6*c*13 show a modular multi-segment tray in a sixth embodiment in which the carrying element has a bottom wall, and the partition walls of the insert are connected by a bottom wall;

[0028] FIG. 7*a*, 7*b*13 show a modular multi-segment tray in a seventh embodiment in which the carrying element has the form of a one chamber tray, and the insert has a variable depth;

[0029] FIG. 8*a*, 8*b*, 8*c*, 8*d*13 show a modular multi-segment tray in an eighth embodiment in which the carrying element has the form of a one chamber tray, and the insert takes an angular position relative to the carrying element;

[0030] FIG. 9*a*, 9*b*, 9*c*, 9*d*13 show a modular multi-segment tray in a ninth embodiment in which the carrying element has the form of a one chamber tray, and the insert has a bottom wall in the form of a wedge;

[0031] FIG. 10*a*, 10*b*, 10*c*, 10*d*13 show a modular multi-segment tray in a tenth embodiment in which the carrying element has the form of a one chamber tray with a bottom wall in the form of a wedge;

[0032] FIG. 11*a*, 11*b*, 11*c*, 11*d*—show a modular multi-segment tray in an eleventh embodiment in which the carrying element has the form of a one chamber tray, and the insert is connected with the carrying element by a form-locked joint;

[0033] FIG. 12*a*, 12*b*, 12*c*, 12*d*13 show a modular multi-segment tray in a twelfth embodiment in which the carrying element has the form of a one chamber tray, and the insert is connected with the carrying element by a form-locked joint;

[0034] FIG. 13—shows a modular multi-segment tray in a thirteenth embodiment provided with two protective covers;

[0035] FIG. 14*a*, 14*b*, 14*c*13 show a modular multi-segment tray in a fourteenth embodiment provided with a protective cover.

EXAMPLE 1

[0036] A modular multi-segment tray 101 in the first embodiment shown in FIG. 1*a* comprises a carrying element 102 (FIG. 1*b*) and a multi-segment insert 103 (FIG. 1*c*). The carrying element 102 is provided with a bottom wall 104, a rear wall 105 and side walls 106 and 107. The multi-segment insert 103 is provided with a rear wall 108, side walls 109 and 110 and a plurality of partition walls 111. The insert 103, after sliding into the carrying element 102, is fastened by means of for example screws 112 fastened in holes 113 and 114. The insert 103 can be also glued into the carrying element 102 or welded with the said element. Both the carrying element 102 and the insert 103 can be made of plastic or metal, and for joining of materials of the carrying element and the insert different commonly known techniques can be used. The abovementioned remarks apply to all embodiments.

EXAMPLE 2

[0037] A modular multi-segment tray 201 in the second embodiment shown in FIG. 2*a* comprises a carrying element 202 (FIG. 2*b*) similar to the carrying element in the first embodiment and a multi-segment insert 203 (FIG. 2*c*). The insert 203 is provided with side walls 209 and 210, a rear wall 208 and partition walls 211; the said insert is also provided with a bottom wall 215. The insert 203, after sliding into the carrying element 202, is similarly as in the first embodiment fastened by means of for example screws.

EXAMPLE 3

[0038] A modular multi-segment tray 301 in the third embodiment shown in FIG. 3*a* comprises a carrying element 302 (FIG. 3*b*) and a multi-segment insert 303 (FIG. 3*c*). The insert 303 is provided with side walls 309 and 310, a bottom wall 315 and partition walls 311. The insert 303, after sliding into the carrying element 302, is similarly fastened by means of for example screws.

EXAMPLE 4

[0039] A modular multi-segment tray 401 in the fourth embodiment shown in FIG. 4*a* comprises a carrying element 402 (FIG. 4*b*) and a multi-segment insert 403 (FIG. 4*c*). The carrying element 402 is provided with a bottom wall 404 and side walls 406 and 407. The insert 403 is provided with a rear wall 408, side walls 409 and 410, a bottom wall 415 and a plurality of partition walls 411. The insert 403, after sliding into the carrying element 402, can be fastened to the carrying element similarly as in the embodiments described above.

EXAMPLE 5

[0040] A modular multi-segment tray 501 in the fifth embodiment shown in FIG. 5*a* comprises a carrying element 502 (FIG. 5*b*) and a multi-segment insert 503 (FIG. 5*c*). The carrying element 502 is provided with a rear wall 505 and side walls 506 and 507. The insert 503, after sliding into the carrying element 502, can be fastened to the carrying element similarly as in the embodiments described above.

EXAMPLE 6

[0041] A modular multi-segment tray 601 in the sixth embodiment shown in FIG. 6*a* comprises a carrying element 602 (FIG. 6*b*) and a multi-segment insert 603 (FIG. 6*c*). The carrying element having a bottom wall 604 is provided with slots 620 into which lugs 621 of the insert 603 are pushed. The insert 603 is provided with a bottom wall 615 and a plurality of partition walls 611, whereas the outermost walls 609 and 610 of the insert will constitute side walls of the tray. The lugs 621, after sliding into the slots 620, can be glued or screwed together or joined in another way.

EXAMPLE 7

[0042] Modular multi-segment trays 701 and 711 (FIGS. 7*a* and 7*b*) in the seventh embodiment comprise a carrying element 702 and multi-segment inserts 703 and 713, respectively, adapted to different lengths of stored rod-shaped articles. The inserts 703 and 713 have a rear wall, a bottom wall, side and partition walls similar to the insert 203 in the second embodiment and the said inserts are fastened to the carrying element 701, 711 by means of screws 712. For one carrying element 702 it is possible to use a plurality of dif-

ferent inserts the depths of which are adapted to different lengths of stored or conveyed articles. The use of trays according to this embodiment in which the carrying elements are the same for different articles allows using of standardised gripping elements in different machines of the production lines and stores designed for the storage of trays in case of a diversification of conveyed and stored articles.

EXAMPLE 8

[0043] A modular multi-segment tray **801** in the eighth embodiment shown in FIG. **8a** comprises a carrying element **802** (FIG. **8b**) and a multi-segment insert **803** (FIG. **8c**), whereas the insert **803** is provided with a spigot **824** designed for pushing into a hole **823** so that a hinge, used for angular setting of the insert **803** relative to the carrying element **802** by an angle α adapted to stored articles is formed (FIG. **8d**). After the angular position of the insert has been set, the said insert is fastened by means of screws or in any other known way. A tray according to this embodiment can be used for conveying and storing rod-shaped articles which have a tendency to slip out of the tray, such as filter cigarettes which due to the thickness of the cigarette paper covering the filter are arranged non-parallel to each other. The effect of slipping out of such articles can be eliminated by an inclination of the bottom of the tray or the bottom and the rear wall of the tray like in the present embodiment.

EXAMPLE 9

[0044] A modular multi-segment tray **901** in the ninth embodiment shown in FIG. **9a** comprises a carrying element **902** (FIG. **9b**) and a multi-segment insert **903** (FIG. **9c**). The carrying element **902** is provided with a flat bottom wall **930** on which a bottom wall **931** belonging to the insert **903** and shaped in the form of a wedge with an inclination angle β will be situated (FIG. **9d**). In this embodiment the insert is fastened to the carrying element by means of screws. The tray in the present embodiment, like in the previous one, can be used for such articles as filter cigarettes which are arranged non-parallel to each other and have a tendency to slip out of the tray.

EXAMPLE 10

[0045] A modular multi-segment tray **1001** in the tenth embodiment shown in FIG. **10a** comprises a carrying element **1002** (FIG. **10b**) and a multi-segment insert **1003** (FIG. **10c**). In contrast to the previous embodiment, the carrying element **1002** is provided with a bottom **1030** shaped in the form of a wedge with an inclination angle β (FIG. **10d**), whereas the multi-segment tray **1003** has a flat bottom **1031** which is inclined relative to the level at an angle corresponding to the angle of inclination of the wedge of the bottom **1030**. The insert **1003** in this embodiment is fastened to the carrying element by means of screws. The tray in the present embodiment, like in the previous one, can be used for articles which are arranged non-parallel to each other and have a tendency to slip out of the tray.

EXAMPLE 11

[0046] A modular multi-segment tray **1101** in the eleventh embodiment shown in FIG. **11a** comprises a carrying element **1102** (FIG. **11b**) and a multi-segment insert **1103** (FIG. **11c**). The carrying element **1102** is provided with depressions **1140** designed for receiving of edges **1141** of the insert **1103**,

whereas the sections of the edge **1141** and the depression **1140** are adequately chosen to make a form-locked joint of the insert **1103** and the carrying element **1102**. In order to assemble the tray, it is enough to push the insert **1103** into the element **1102**, whereas the depression **1140** as well as the depression **1141** of the insert **1103** must be dimensioned so as to make pushing the insert into the carrying element possible. Additionally glue or connecting elements such as screws can be used. FIG. **11d** shows an enlarged fragment A of an assembled tray **1101** of FIG. **11a**.

EXAMPLE 12

[0047] A modular multi-segment tray **1201** in a twelfth embodiment shown in FIG. **12a** comprises a carrying element **1202** (FIG. **12b**) and a multi-segment insert **1203** (FIG. **12c**). The carrying element **1202** is provided with depressions **1250** designed for receiving of edges **1251** of the insert **1203**, whereas the sections of the edge **1251** and the depression **1250** are adequately chosen to make a form-locked joint of the insert **1203** and the carrying element **1202**. In order to assemble the tray, it is enough to push the insert **1203** into the element **1202**, whereas the depression **1250** as well as the depression **1251** of the insert **1203** must be dimensioned so as to make pushing the insert into the carrying element possible. Additionally glue or connecting elements such as screws can be used. FIG. **12d** shows an enlarged fragment B of an assembled tray **1201** of FIG. **12a**.

EXAMPLE 13

[0048] A modular multi-segment tray **1301** in a thirteenth embodiment shown in FIG. **13** is provided with upper **1360** and front **1370** protective covers which constitute a protection against falling out of stored articles. The tray **1301** is provided with fastening means for the covers, the upper cover **1361** and the front cover **1371**, respectively. The fastening means can be slots through which the covers are inserted and which hold the covers in a proper position.

EXAMPLE 14

[0049] A modular multi-segment tray **1401** in a fourteenth embodiment shown in FIG. **14a** is provided with a cover **1480** (FIG. **14c**). The cover is fastened with the aid of fastening means **1481** and **1482** (FIG. **14b**). The fastening means can be edge latches at which the cover **1480** is fastened.

[0050] As can be seen from the embodiments described above, the fastening means can be elements of a bolted, form-locked, glued or hinged joint.

1-15. (canceled)

16. A modular multi-segment tray (**101**) for use in the tobacco industry for conveying rod-shaped articles, characterized in that it comprises a carrying element (**102**), a single multi-segment insert (**103**) and fastening means (**112**, **113**, **114**) adapted to join the carrying element (**102**) and the single multi-segment insert (**103**).

17. The modular tray according to claim 16, characterized in that the fastening means are elements of a bolted, form-locked, glued or hinged joint.

18. The modular tray according to claim 17, characterized in that the fastening elements (**823**, **824**) allow the adjustment of the inclination angle (α) of a single multi-segment insert (**803**).

19. The modular tray according to claim 16, characterized in that it is provided with protective covers (**1360**, **1370**) and

additional fastening elements (1361, 1371) for receiving the protective covers (1360, 1370).

20. A carrying element (102) of a modular multi-segment tray for use in the tobacco industry for conveying rod-shaped articles, characterized in that it comprises at least one carrying wall provided with fastening means (113) adapted to fastening in the carrying element (102) of the single multi-segment insert (103).

21. The carrying element according to claim 20, characterized in that the carrying element (102) has the form of a one chamber tray provided with fastening means (113).

22. The carrying element according to claim 20, characterized in that the carrying element has the form of a single bottom wall (602) provided with fastening means (620).

23. The carrying element according to claim 20, characterized in that the carrying element comprises side walls (506, 507) and a rear wall (505) provided with fastening means, whereas the fastening means are disposed either on the side walls (506, 507) or on the rear wall (505), or both on the side walls (506, 507) and the rear wall (505).

24. The carrying element according to claim 20, characterized in that the carrying element comprises a bottom wall (404) and side walls (406, 407) provided with fastening means, whereas the fastening means are disposed either on the bottom wall (404) or on the side walls (406, 407), or both on the bottom wall (404) and the side walls (406, 407).

25. A single multi-segment insert of a modular tray for use in the tobacco industry for conveying rod shaped articles,

characterized in that it comprises a set of interconnected partitions (111) defining individual segments of the tray, where in addition the insert is provided with fastening means (114).

26. The multi-segment insert of a modular tray according to claim 25, characterized in that a set of interconnected partitions (311) defining individual segments of the tray is connected by means of a bottom wall (315).

27. The multi-segment insert of a modular tray according to claim 25, characterized in that a set of interconnected partitions (211) defining individual segments of the tray is connected by means of a bottom wall (215) and a rear wall (208).

28. The multi-segment insert of a modular tray according to claim 25, characterized in that a set of interconnected partitions (111) defining individual segments of the tray is connected by means of a rear wall (108).

29. The multi-segment insert of a modular tray according claim 25, characterized in that a set of interconnected partitions (111, 211, 311) defining individual segments of the tray has a depth adapted to the length of conveyed rod-shaped articles, in particular has a depth smaller than the depth of a carrying element.

30. The multi-segment insert of a modular tray according to claim 25, characterized in that the bottom of the insert (931, 1031) or the bottom of the carrying element (1030) is set at an angle (β) relative to the level.

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