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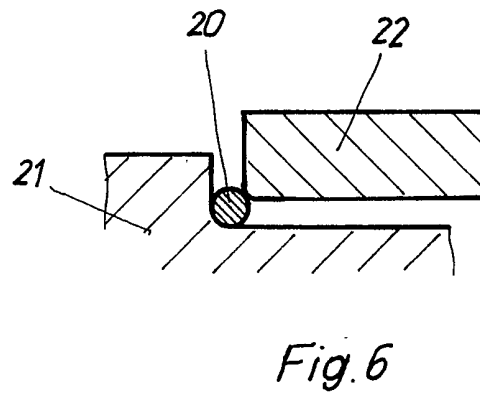
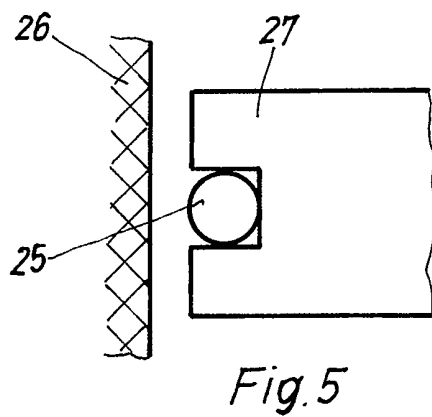
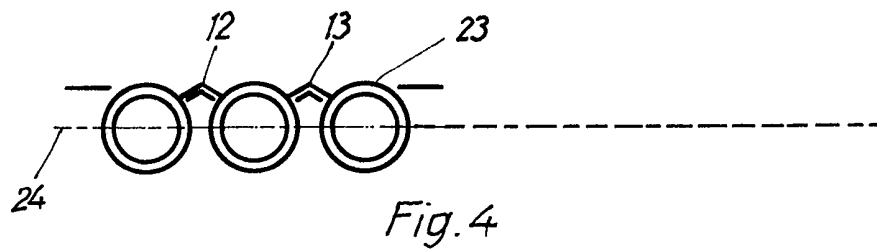
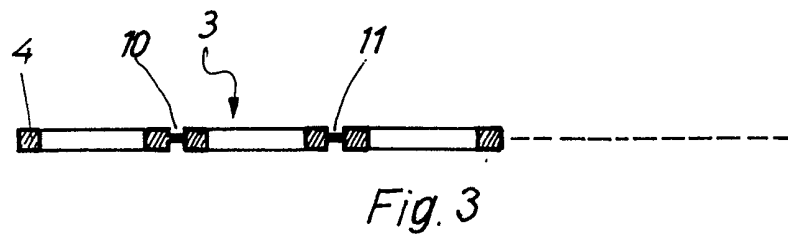
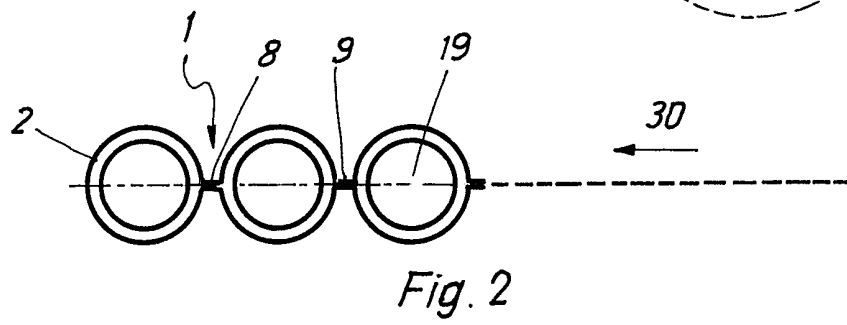
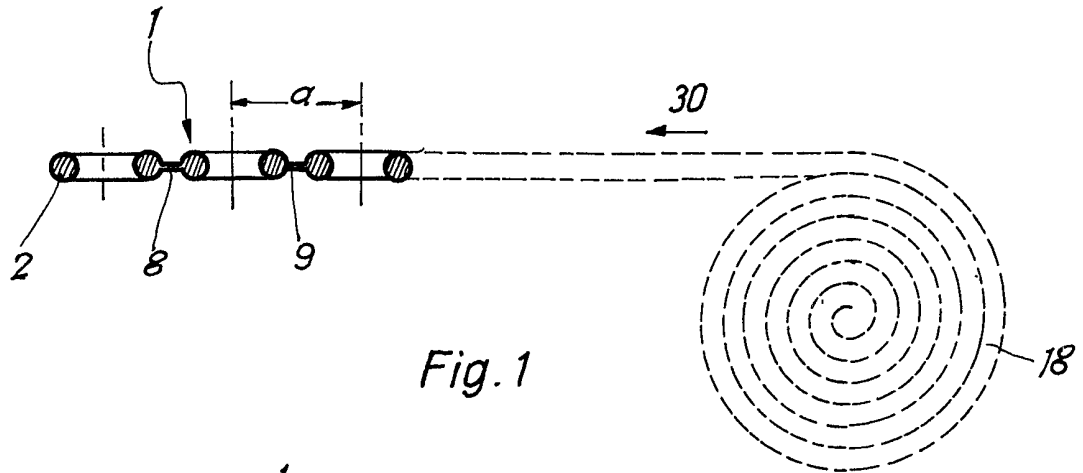
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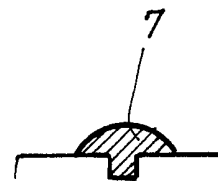
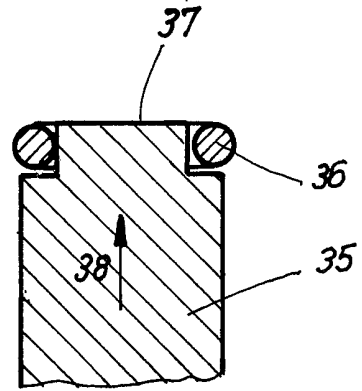
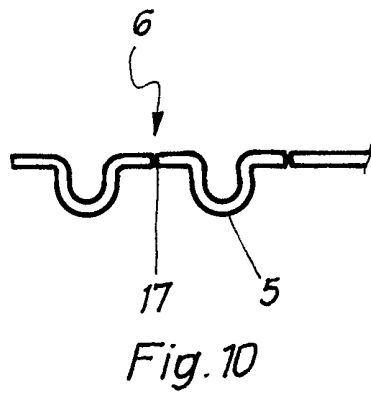
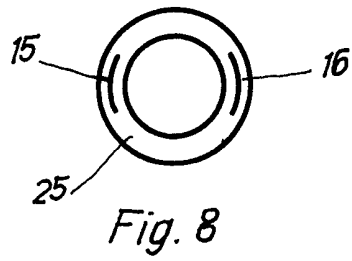
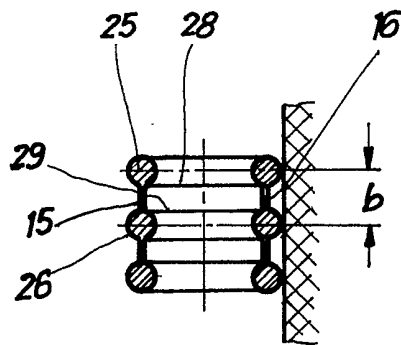
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(54) **Pack of Disc-like Parts**

(57) A storage pack is designed for round, ring-like or button-like flat parts, made for example of synthetic resin by injection moulding or pressing. Such parts may, for example, be stoppers, ornament buttons for furniture and, more specially, ring gaskets, for example for air-powered or liquid powered plant. Such gaskets

may take the form of precision O-rings or flat ring gaskets. In the storing system these parts are joined together in rows or columns side-by-side or one on top of the other to form a single unit or configuration which may be handled and stored, for example in dispensers. In such rows or columns, each part is joined with the adjacent parts by a readily fangible connection or bridge-piece.





SPECIFICATION

A Pack of Disk-like Parts and a Way of Using Same

The invention is with respect to a pack for disk-like parts and, more specially, to such a pack or storage system whose parts are of synthetic resin, produced, for example, by injection molding or pressing, the parts having a round, ring-like or button-like, flat form as for example stoppers, ornament buttons for furniture and, more specially, however, for ring gaskets for use, for example, with air-powered or liquid-powered systems, as for example in the form of precision O-ring gaskets, "regular quality" O-ring gaskets, flat ring gaskets and others. The invention is furthermore with respect to a way of taking single parts from such a storing system, configuration, structure or arrangement and for then placing them in a position in or on a workpiece. Lastly, the invention is with respect to an apparatus for undertaking this working operation.

In many cases, parts of the sort coming into question here, as for example precision O-rings or washers for use in airpower or liquid-power systems, are supplied packed loosely in bags, that is to say without being put in any given order so that they then have to be taken from the bags separately by hand and put into the position of the work where they are needed. This is responsible for shortcomings, because, when such parts are supplied loosely, they may not readily be taken from the bags automatically so as to be facing in any given, desired direction and so, for this reason, may not be used with automatic assembly plant. However, a more specially important shortcoming is to be seen in the case of ring gaskets such as precision or standard O-ring gaskets or flat ring gaskets for use in air-power or liquid-power systems, because assembly work is slower and more painstaking and makes for a great increase in the price of the work being undertaken.

One purpose of the present invention is that of taking care of these shortcomings and designing a storage pack for parts of the sort in question so as to make possible automation of the handling of precision O-ring gaskets, this being important from the price angle, more specially, in view of the price level of non-metallic materials. A further purpose of the invention is that of designing a process and an apparatus which, as well, make for less painstaking and simpler assembly and putting the parts in or on the workpiece.

For this purpose, in the case of the present invention, a storage pack is made up of a number of parts, which are placed side-by-side or on top of each other in rows or columns to take the form of a unit which may be readily handled and be kept in a dispenser, and each part is joined up with the next part by at least one connection which may readily be broken. In this respect, it is best for the connections or bridgepieces to be made less strong at a given point so as to have the function of frangible joins. With the invention,

it becomes possible for the parts stored in the pack or storing structure to be moved forwards towards the position at which they are used and on assembly the connection between the first part in the line or chain and the one next to it may be broken at the position of the join, which may be designed in the form of a frangible join so that the broken off part may be moved further forwards to the point of use, while having a given position in relation to other parts of the apparatus.

In the case of a preferred working example of the invention, in the case of which the pack is made up of ring gaskets and, more specially of precision O-rings (gaskets), the gaskets may be joined together, for example side-by-side next to each other, to take the form of a long band or chain-like pack structure, in a rolled-up form. The handling of such ring gaskets stored in this way is specially simple. In the case of ring gaskets for fixed parts (static seals), the connections or bridgepieces between one gasket and the next gasket may be in line with each other and lined up with the middle line or axis of the band or chain-like structure while, on the other hand, if it is a question of ring gaskets for moving parts (dynamic seals), the bridgepieces or connections between one ring and the next ring may be on a line which is off the middle line of the band or chain-like structure and is best parallel thereto. In the case of such a system, the frangible joins are at some distance from points at the outline of the ring gasket which are responsible for guiding and gasketing of the part with the gasket on it, when the part is being moved in use.

In a case of a further form of the invention, made up as well of ring gaskets, more specially precision O-rings, the gaskets may be joined up together, with their flat sides resting against each other, to take the form of an upright or horizontal stack or pack.

The process of the invention for taking single parts from a pack of the sort noted and for placing them in or on a workpiece is characterized in that the row or column is moved in the direction of its lengthways middle axis in steps, whose size is the same as the distance between the middle planes of one part and the next one as measured in the direction of motion and whose timing is in line with the operation of the machine or apparatus to which the parts are to be supplied, the parts being moved to a separating unit, in that in the separating unit the connection between the first part and the next one coming after it is broken at the frangible join or joins and then the separated part, in a desired, ordered position, is moved forwards to the position at which it is put in a support, for example on the workpiece. The design may, for example, be such that, if it is a question of the handling of ring gaskets as for example precision O-rings, the gasket is moved along a greasing or lubricating path between the separating unit and the position at which the parts are put in the work, and in which, for example, using oil mist best produced by a spraying nozzle or the like, the parts are

lubricated. It is possible with the process of the invention to make certain in a simple way and using a simple system, that the precision O-rings or like ring gaskets are generally completely

5 automatically put in position in the workpiece.

The new way of operation is, more specially, useful in the case of an apparatus which, as part of a further development of the invention, takes the form of a gun with an ejection system and

10 which gets the single ring gaskets, as for example precision O-rings, in a row or column, which are supplied by the gun in steps to the next machines or apparatus so as to be timed with the operation of such machines, the first ring in question in the

15 row or column being broken off and moved forwards in the desired position towards the workpiece into which it is to be placed. The ejection system may, for example, have a pin over which, in each case, the furthest forward, broken

20 off ring is slipped, the ring then being transported forwards while supported on this pin, by which it is then placed into or onto the workpiece at the position at which the rings are put in position. The design of such an apparatus as part of the

25 invention is simple and it is furthermore simple and trouble-free in its workings.

An account will now be given using the figures of working examples of the invention and of the apparatus for undertaking the process of the

30 invention.

Figure 1 is a partly sectioned, diagrammatic side view of a first storing system based on the present invention.

Figure 2 is a view looking down on the pack or

35 storing system of figure 1.

Figure 3 is a view of a further development of the system of figure 1, partially sectioned as in this figure.

Figure 4 is a view of a further development of the system of figures 1 and 2, seen

40 diagrammatically looking downwards.

Figure 5 is a view to make clear the use of the working example of figure 4 as seen from the side in section and on a greater scale.

Figure 6 is again a side view, partly in section on a greater scale to make clear the use of the working example of the invention to be seen in

45 figure 2.

Figure 7 is a side view and axial section of a further changed form of the invention.

Figure 8 is a view looking down on the system of figure 7.

Figure 9 is a detail of an apparatus for undertaking the new process, in a partly cut-away

55 side view.

Figures 10 and 11 are diagrammatic side views of two further working examples of the invention.

On turning to figures 1 and 2, a pack or storing system or arrangement 1 will be seen made up of a row or precision O-ring gaskets produced from synthetic resin, for example by injection molding or by pressing. In place of precision O-ring

60 gaskets 2, the pack of the storing system might

65 be made up of flat sealing ring gaskets 4, see figure 3 at 3. In place of such flat ring gaskets, the invention may furthermore be used in the case of "regular quality" O-rings. More importantly, such ring gaskets are used for air-powered and liquid-

70 powered plant. However, the storing system may furthermore be used for, or made up of other ring or button-like round parts or disks as for example stoppers 5 for threaded holes, to be seen in the storing system 6 of figure 10, or the parts may

75 take the form of ornament buttons 7 for furniture, see the system of figure 11, it being clear that the storing system of the present invention is made up of a number of parts which are joined together to take the form of a row (see figures 1, 2 and 3)

80 or possibly of columns, as will be later gone into in connection with figures 7 and 8, the parts being placed side-by-side or one on top of the other and each part being joined to the next part by connection or bridge-pieces 8, 9 or, in the

85 other case, 10, 11 (figure 3), 12, 13 (figure 4), 15, 16 (figures 7 and 8), or 17 (figure 10), such connections best being readily broken, that is to say frangible, at a desired position which is made weaker or thinner than the material next to it. In the system of figures 1 and 2 or, in the other case,

90 3 and 4, the rings are placed side-by-side to take the form of a long band- or chain-like structure which as will be seen in figure 1, is rolled up as a roll 18. In this case, looking in the length-direction of the band- or chain-like structure, on each side

95 of each given ring gasket, there is a connection or bridgepiece 8, 9, in the one case, 10, 11 in the other case, or 12 and 13. This is naturally not true for the first and last ring gasket in the row, which

100 will only have one connection or bridgepiece. In the system of figures 1 and 2, the connections or bridgepieces, between each one ring gasket and the next one, are in a line which is on the lengthways middle axis 19 of the band- or chain-

105 like structure. In this case, when each part is broken off at the connection or bridgepiece at the points where the last-named is readily frangible, the connection being on the lengthways middle axis of the band or chain, a line of uneven

110 structures are formed on the outer edge of the precision O-ring gasket and which may be used for guiding and sealing purposes in the case of gaskets for moving parts. For this reason, it is best for the pack form of figures 1 and 2 to be used for

115 ring gaskets 20 for unmoving parts 21 and 22 (static seal) as in figure 6. If the ring gaskets are to be used for glands between moving parts (dynamic seals) it is best (see figure 4) for the connections or bridgepieces 12 and 13 between

120 one ring gasket and the next one to be placed on a line 23 (as marked in figure 4) off the middle line 24 of the chain structure but parallel thereto. In this case, the flash or rough structures 25, produced when the rings are parted (see figure 5),

125 would be at a position, which, when the part 27 with the ring gasket on it is moved, does not take part in guiding and sealing on running against part 26. As will be seen in figures 7 and 8, ring gaskets and more specially precision O-ring gaskets may

be part of a pack which is so structured that ring gaskets 25, 26 and 27 have their flat sides 28 and 29 resting against each other, or at least turned towards each other, the gaskets being
 5 stacked one above the other, or possibly, horizontally. Looking in the length-direction of the stack, see figures 7 and 8, at each flat side, turned towards the next ring gasket, of a gasket at least
 10 present, which may be circular and, in this respect, have a form in harmony with, or at the same level as, the outline of the gasket or on each side of a ring it is possible to have a single connection or bridgepiece limited to a single point
 15 or, lastly, as in the system of figure 8, each side 2 of a ring gasket may have two, for example diametrically opposite, connections or bridgepieces 15, 16, which are limited to single points. For many cases of use such a design is of specially
 20 good effect.

For taking single parts, for example precision O-ring gaskets, from the pack, as presented in the figures noted so far, and then placing such a gasket in position, it is best to make use of a
 25 working process which is, as well, part of the present invention and in the case of which the row or column is moved in steps along its middle lengthways axis as arrowed at 30, the steps being such that they are the same in size as the
 30 distance, measured in the direction of forward motion, between the middle planes of one part and the next one and equal to the distance "a" in figure 1 or the distance "b" in figure 7, such steps being timed to be in harmony with the speed of
 35 operation of the machine or apparatus to which the gaskets are supplied. The band or the chain or, in the other case, the stack, are moved in this way to a separating or parting unit, in which the connection between the first part in the row and
 40 the next one is broken at the frangible connection point or points, the apparatus used for this purpose being like a gun or some other hand-held unit, to which the bands of single ring gaskets or other parts are supplied and which has an ejection
 45 system to which the single ring gaskets, for example precision O-ring gaskets in their row or column are supplied in steps with a timing dependent on the operation of the machine or apparatus to be supplied with gaskets. In the
 50 separating unit, the first ring gasket is parted from the row or column and then moved on further, in a given position in relation to the rest of the apparatus, towards the work in which or on which it is to be placed. The separating operation may
 55 be undertaken suddenly by the blows of a pusher part which is moved forwards violently, although the parting operation, if the frangible join is weak enough, and has a line of weakness, may be caused by compressed air by itself. In such a case,
 60 next, the separated part is moved forwards, with a desired position in relation to other parts of the system, to a point at which it is placed in or on a supporting structure, for example the work. For moving or pushing forward the parts use may be
 65 made of compressed air by itself although,

however, the ejection system may make use of a specially designed pin (see figure 9, part 35) which is slipped into the ring 36, which is at the front end of the row or stack, after parting, so that
 70 the ring is taken up on its smaller end 37 and kept positioned on it at the time of forward transport and the ring gasket may then be placed in the workpiece at the position where this is done. A useful effect may furthermore be produced, in
 75 some cases, if the gasket to be lubricated and, in this case, as part of a further development of the process of the invention, the ring gasket is moved between the separating unit and the position of putting it into or onto the work along a path in
 80 which it is greased or otherwise lubricated. For this purpose it is possible to make use of a lubricating nozzle or the like producing an oil mist, for example, by spraying.

Claims

85 1. A pack of disc-like parts wherein the parts are joined together in chains for storing purposes, the parts being located adjacent to each other and joined together by at least one readily broken bridgepiece which is less strong than the parts
 90 joined thereby, said bridgepieces forming frangible connections.

2. A pack as claimed in claim 1, wherein the parts are ring gaskets which are joined up together side-by-side in the form of a chain-like
 95 structure the latter being capable of being rolled up, each ring gasket in the structure, but for the ring gaskets at ends of the structure, having two bridgepieces joining the gasket with the adjacent gaskets.

3. A pack as claimed in claim 2, wherein each join between each ring gasket and the adjacent ring gasket is located in a line, running
 100 lengthways along and in the middle of the chain-like structure.

4. A pack as claimed in claim 2, wherein each join between each ring gasket and the adjacent ring gasket is in a line, running lengthwise along and spaced from the middle line of the chain-like structure, and parallel to said middle line.

5. A pack as claimed in claim 1, wherein the parts are ring gaskets which have flat sides, the gaskets having their flat sides located against each other and being in the form of an upright or
 110 horizontal stack, each flat side of each ring gasket being joined by at least one bridgepiece with the adjacent ring gasket.

6. A pack as claimed in claim 5, wherein each bridgepiece is round and has a form corresponding to the outline of the ring gasket to
 120 which it is joined.

7. A pack as claimed in claim 5, wherein each ring gasket side has a single bridgepiece, generally limited to a single point.

8. A pack as claimed in claim 5, wherein each ring side has two diametrically opposite or other
 125 bridgepieces, each generally limited to a single point.

9. A pack as claimed in claim 1, wherein said parts are stoppers.
10. A pack as claimed in claim 1, wherein said parts are ornament buttons for furniture.
- 5 11. A pack as claimed in claim 1, wherein said parts are gaskets for fluids for use in fluid-powered systems.
12. A pack as claimed in claim 1, wherein said parts are precision O-ring gaskets.
- 10 13. A pack as claimed in claim 1, wherein said parts are produced from synthetic resin by injection moulding or by pressing.
14. A process for taking single parts from a pack as claimed in any of claims 1 to 13, and
- 15 positioning the single parts in relation to a workpiece, wherein the parts, placed in a line or column, are moved lengthways forwards in steps, whose size, measured in the direction of forward transport motion, is equal to the centre-to-centre
- 20 distance of said parts, such forward stepping motion being timed to be in line with the operation of a further machine supplied with the parts, and the line of workpieces is moved through a separating unit, in which the joins
- 25 between the parts are broken at the frangible connections, and the separate parts are moved forwards in an ordered line-up in relation to each other to a unit for putting them into a support or workpiece.
- 30 15. A process as claimed in claim 14, wherein the separate parts are moved along a lubricating path between the separating unit and the position at which the parts are placed in the workpiece, the separate parts being lubricated by an oil mist
- 35 produced by a lubricant nozzle as they are moved along the path.
16. A process as claimed in claim 14 or 15, wherein the parts are ring gaskets.
17. An apparatus for undertaking the process of claim 16, the apparatus having the form of a
- 40 gun and an ejection system to which the separate ring gaskets are transported from their lines or columns in step with the machine following the gun, and in which the foremost ring gasket in the chain-like structure is, in each case, parted from the rest of the ring gaskets in the line or column and is then moved in an ordered line-up to a unit for putting the ring gasket on the workpiece.
- 45 18. An apparatus as claimed in claim 17, wherein the unit for putting the ring gaskets in the workpiece, has a pin-like support for being slipped into each of the rings after they have been separately broken off from the rest of the ring gaskets, the support positioning each separate
- 50 part for transport and then placing the separate part in the workpiece.
19. A pack of disc-like parts, substantially as hereinbefore described with reference to the accompanying drawings.
- 55 20. A process as claimed in claim 14, substantially as hereinbefore described with reference to the accompanying drawings.
- 60 21. An apparatus as claimed in claim 17, substantially as hereinbefore described with reference to the accompanying drawings.
- 65 22. Any novel subject matter or combination including novel subject matter herein disclosed, whether or not within the scope of or relating to the same invention as any of the preceding claims.
- 70