

Circular Slide Tray

The invention relates to a circular slide tray which can be releasably connected with a slide projector and has radially extending slide compartments arranged between an inner and an outer cylindrical wall, a bottom portion associated with the inner cylindrical wall and provided with a central bore that cooperates with a spindle provided on the projector, an annular plate positioned below the slide compartments, provided with a slide passage opening and rotatably guided under friction on the outer surface of said bottom portion, a device for locking said plate in the inoperative position of the slide tray in which the slide passage opening of said plate is in alignment with an empty slide compartment as well as resilient holding noses provided on the outer surface of said bottom portion for engaging behind the inner edge of said plate.

A circular slide tray of this type is known from DE-U 80 20 336. The friction means of that tray which influence the rotary movement of the tray body relative to the angular plate consist of a spring which acts on the locking device for the plate and of a ball pressed into contact with said plate under the force of said spring.

Since in the case of this known circular tray the friction means engages the plate at a single point and friction is low and since, moreover, the plate is unilaterally loaded, additional rigid projections are provided in the areas between the resilient holding noses arranged on the outer surface of the bottom portion in order to increase the friction and to distribute the frictional forces uniformly. As a result, however, the plate is given a wave-shaped curvature and large frictional forces are created by the rigid friction means during rotary movement of the tray body on the plate.

It is the object of the invention to further develop and improve the known circular slide tray such that unilaterally occurring frictional forces are avoided and that in spite of a plurality of friction means engaging the plate, said plate is neither curved nor subjected to excessive frictional forces.

In accordance with the invention, this object is attained in that in order to increase the friction between the plate and the bottom portion, the resilient holding noses are associated with friction means which are spring-biased into contact with the surface of the plate. In a preferred embodiment, the friction means are arranged directly in the area of each of said holding noses.

According to an advantageous feature of the invention, the outer surface of the bottom portion is associated with a circumferential support surface for the plate. The friction means provided are resiliently yielding projections and fingers respectively formed by recesses in the support surface in the area of said holding noses and having bent-off portions extending in the direction of said holding noses.

Further features and advantages of the invention can be inferred from the description of a number of embodiments illustrated in the drawings.

In the drawings:

Fig. 1 is a perspective view of the subject matter of the invention in a partially illustrated circular slide tray, shown upside down;

Fig. 2 shows a section, taken along line I-I in Fig. 1, of the subject matter of the invention;

Fig. 3 shows the subject matter of the invention in a side view representing a section taken in the direction of the arrow X in Fig. 1;

Fig. 4 is a perspective view of a number of embodiments of the subject matter of the invention in a partially illustrated circular slide tray shown upside down; and

Fig. 5 shows a section, taken along line II-II in Fig. 4, of one of the embodiments of the subject matter of the invention.

The circular slide tray shown substantially in an upside-down position in Fig. 3 comprises an inner cylindrical wall 17 and an outer cylindrical wall 18 between which the radially extending slide compartments 15 are arranged. The inner cylindrical wall 17 is associated with the bottom portion 1 which comprises a central bore 11 cooperating with a spindle provided on the projector. Below the slide compartments 15, there is an annular plate 13 with a slide opening, said plate being rotatably guided on the outer surface 2 of the slightly projecting bottom portion 1.

The plate 13 is mounted by means of three uniformly spaced resilient holding noses 10 provided on the circumference of the outer surface 2 of the bottom portion 1. When the plate 13 is assembled it is placed on the insertion slopes of the holding noses 10. When the plate 13 is pressed onto them, these noses yield and then snap over the plate to engage its inner edge.

A locking lever not illustrated in detail which is arranged between the inner side of the inner cylindrical wall 17 and the inner side of the bottom portion 1 extends with an engagement finger 20 into the range of an opening 12 of bottom portion 1. The engagement finger 20 rests against the inner edge of plate 13 and engages a recess 14 at the inner edge of the plate 13 respectively to lock said plate.

When the slide tray is inserted into a projector with the plate 13 locked, a spindle of the projector (not illustrated) extending through the central bore 11 of the bottom portion 1 of the tray pivots said locking lever so that the engagement finger 20 moves out of the recess 14 and frees the plate 13.

When the tray is in its operative position and the tray body is rotated relative to the plate 13 which is held by means provided on the projector, friction means provide for an adequate friction between the plate 13 and the tray body. In order to obtain uniformly distributed friction forces, these friction means are associated with the three resilient holding noses 10. To this end, the friction means are spring-biased into contact with the surface of the plate 13.

As shown in particular in Fig. 1, the outer surface 2 of bottom portion 1 is associated with a circumferential support surface 3 on which the plate 13 is supported.

In a first embodiment, resiliently yielding projections 7 formed by recesses 4, 5 and 6 are provided in the support surface 3 in the area of the three holding noses 10, each projection having a centrally arranged bent-off portion 8 which extends in the direction of one of the holding noses 10.

As can be seen from Figs. 4 and 5, the projection 7 as shown in Figs. 1 and 2 can be centrally divided by a transverse slot 40 in the area of the bent-off portion 8 so that in a further embodiment according to Figs. 4 and 5, resiliently yielding fingers 70 are formed in the support surface 3 in the area of the holding noses 10 by recesses 4, 5, 6 and the transverse slot 40, said fingers having bent-off portions 80 extending in the direction of the holding noses 10.

As can also be seen from Fig. 4, the fingers 70 arranged in the support surface 3 directly in the area of the holding noses 10 are each associated with two resiliently yielding tongues 700 formed by recesses 50 and having bent-off portions 800 extending in the direction of the plate 13. These resilient tongues 700 could also be associated with the projections 7 shown in Fig. 1. It is also readily conceivable that the resilient projections 7 and fingers 70 respectively could be omitted, and in a further embodiment such resilient tongues 700 only are provided in the support surface 3 in the area of the holding noses 10.

As will be substantially apparent from Figs. 2 and 5, the flexibility of the projections 7 and fingers 70 respectively and/or tongues 700 is chosen such that the friction surfaces 9 and 90 respectively and/or 900 of their bent-off portions 8 and 80 respectively and/or 800, which are spring-biased into contact with the surface of the plate 13, are positioned in the plane of the support surface 3 when in their operative positions. In the operative position of the bent-off portions 8 and 80 respectively and/or 800, the distance between the support surface 3 and the holding noses is adapted to the thickness of the plate 13.

As shown in Fig. 3, the flexibility of the projections 7 and fingers 70 respectively and/or tongues 700 can, however, also be chosen such that the friction surfaces 9 and 90 respectively and/or 900 of the bent-off portions 8 and 80 respectively and/or 800 which are spring-biased into contact with the surface of the plate 13 are positioned above the plane of the support surface when in their operative positions. In this case, the distance between the friction surfaces 9 and 90 respectively and/or 900 and the holding noses 10 corresponds to the thickness of the plate 13.



Patent Claims

1. Circular slide tray which can be releasably connected with a slide projector and has radially extending slide compartments (15) arranged between an inner (17) and an outer cylindrical wall (18), a bottom portion (1) associated with the inner cylindrical wall (17) and provided with a central bore (11) which cooperates with a spindle provided on the projector, an annular plate (13) positioned below the slide compartments (15), provided with a slide passage opening and rotatably guided with friction on the outer surface (2) of said bottom portion (1), a device for locking said plate (13) in the in-operative position of the slide tray in which the slide passage opening in said plate (13) is in alignment with an empty slide compartment as well as resilient holding noses (10) provided on the outer surface (2) of said bottom portion (1) for engaging behind the inner edge of said plate, friction means (7, 8; 70, 80; 700, 800) being provided between the plate (13) and the bottom portion (1) for increasing the friction, said friction means being spring-biased into contact with the surface of the plate (13), and the outer surface (2) of the bottom portion (1) having a circumferential support surface (3) for the plate (13), c h a r a c t e r - i z e d in that the friction means are arranged in the form of resiliently yielding means in the support surface (3) directly in the area of the holding noses.
2. Circular slide tray according to claim 1, characterized in that the friction means are designed as resiliently yielding projections (7) and fingers (70) respectively having bent-off portions (8 and 80 respectively) extending in the direction of the holding noses (10), said projections or fingers being formed by recesses (4, 5, 8 and 4, 5, 6, 40 respectively).



3. Circular slide tray according to claim 1, characterized in that at least three holding noses (10) with associated friction means (7, 8; 70, 80) are distributed over the area of the outer surface (2) of the bottom portion (1).
4. Circular slide tray according to claim 1, characterized in that further resiliently yielding tongues (700) formed by recesses (50) in the support surface (3) in the area of the holding noses (10) and having bent-off portions (800) extending in the direction of the plate (13) are provided as friction means associated with the projections (7) and fingers (70) respectively.
5. Circular slide tray according to claims 1 to 4, characterized in that the flexibility of the projections (7) and fingers (70) respectively and/or tongues (700) is selected such that the friction surfaces (9 and 90 respectively) and/or (900) of the bent-off portions (8 and 80 respectively) and/or (800) which are spring-biased into contact with the surface of the plate (13) are positioned in the plane of the support surface (3) (Figs. 2 and 5) when in their biased operative positions.
6. Circular slide tray according to claims 1 to 5, characterized in that the flexibility of the projections (7) and fingers (70) respectively and/or tongues (700) is selected such that the friction surfaces (9 and 90 respectively) and/or (900) of the bent-off portions (8 and 80 respectively) and/or (800) which are spring-biased into contact with the surface of the plate (13) are positioned above the plane of the support surface (3) when in their biased operative positions (Fig. 3).



7. Circular slide tray according to claims 1 to 3 and 6, characterized in that in the operative positions of the bent-off portions (8 and 80 respectively) and/or (800), the distance between the support surface (3) and the holding noses (10) is adapted to the thickness of the plate (13) (Figs. 2 and 5).
8. Circular slide tray according to claims 1 to 3 and 7, characterized in that in the operative positions of the bent-off portions (8 and 80 respectively) and/or (800), the distance between the friction surfaces (9 and 90 respectively) and/or (900) and the holding noses (10) corresponds to the thickness of plate (13) (Fig. 3).

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I hereby verify that to the best of my knowledge the above translation corresponds to the original text of the specification of European Patent (UK) No. 0 094 606.

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Else Valentin