

CLEANER DEVICE

This invention relates to a cleaner device used to clean a surface, for example, of floor or wall with a wiping sheet detachably fastened thereto.

Such a cleaner device is well known, which comprises a rectangular plate-like assembly having top and bottom surfaces, and a stick and mechanical clamp means provided on the top surface so that a rectangular wiping sheet made of suitable material such as nonwoven fabric may be placed against the bottom surface, then opposite side margins of the wiping sheet may be folded back along respective side edges of the plate-like assembly onto the top surface and finally the side margins may be clamped by the clamp means. The cleaner device may be moved with the stick held by the user's hands to wiping dust and/or dirt on floor or wall with the wiping sheet placed against the bottom of the plate-like assembly.

For such a cleaner device, the wiping sheet is preferably maintained under a tension during use of the cleaner device. To tension the wiping sheet, the user begins by clamping one of the side margins of the wiping sheet. Then the other side margin is tensioned by holding this side

margin with the user's one hand and clamped this side margin with the user's other hand under a tension. However, operation of attaching the wiping sheet to the cleaner device by using the user's both hands sequentially is troublesome beyond anticipation.

In view of the problem as has been described above, it is a principal object of the invention to provide a cleaner device facilitating a wiping sheet to be attached to a cleaner device.

The object set forth above is achieved, according to the invention, by a cleaner device comprising a plate-like assembly having a top surface, a bottom surface, clamp means provided on the top surface so that both side margins of a wiping sheet placed against the bottom surface may be folded back along both side edges of the plate-like assembly onto the top surface and clamped by the clamp means to detachably attach the wiping sheet to the plate-like assembly, the cleaner device being characterized in that: the clamp means are mounted on the top surface of the plate-like assembly and arranged so as to clamp the wiping sheet in its regions defined between planar fasteners adapted to detachably fasten the wiping sheet and the both side edges of the plate-like

assembly along which the wiping sheet is folded back, respectively.

Preferably, regions assigned on the top surface of the plate-like assembly to mount the planar fasteners are recessed relatively to the top surface so that at least base sheets of the fasteners may lie at a level lower than the top surface surrounding the regions.

According to an alternative embodiment of the invention, the respective planar fasteners mounted on the plate-like assembly in the regions have their top ends lying at the same level as the top surface surrounding the regions or at a level lower than the top surface surrounding the regions.

Fig. 1 is a perspective view showing an embodiment of the cleaner device according to the invention;

Fig. 2 is a sectional view taken along a line II - II in Fig. 1

Fig. 3 is a fragmentary perspective view showing the cleaner device; and

Fig. 4 is a fragmentary sectional view taken along a line IV - IV in Fig. 3.

Details of a cleaner device according to the invention will be more fully understood from the description given hereunder with reference to the accompanying drawings.

A cleaner device 1 shown by Fig. 1 in a perspective view comprises a plate-like assembly 2 and a stick 4 mounted by a conventional universal joint 3 to the plate-like assembly 2. Referring to Fig. 1, a wiping sheet 5 is indicated by imaginary lines and the stick 4 is shown as partially broken away.

The plate-like assembly 2 is substantially shaped in a rectangle defined by a pair of opposite long sides 6A, 6B extending transversely as viewed in Fig. 1 and a pair of opposite short sides 7A, 7B. The plate-like assembly 2 comprises a main body 8 made of hard plastics and elastic member 9 covering a peripheral surface 21 as well as a bottom surface 10B (See Fig. 2) of the main body 8. A top surface 10A of the main body 8 defining a top surface of the cleaner device 1 is provided in the middle of a line dividing the pair of short sides 7A, 7B in two with a pair of projections 11 aligned with each other on the line for mounting of the universal joint 3. In addition, the top surface 10A is formed with recesses 16 respectively extending between the respective short sides 7A, 7B and the respective projections

11. The recesses 16 are shown in Fig. 1 as having their practically entire areas covered with respective clamping arms 13 which have, in turn, their respective inner ends 14 mounted by hinge mechanisms on the main body 8 so that these arms 13 may be selectively raised or flattened. Such operation of raising or flattening the respective arms 13 may be carried out by holding outer ends 15 of the respective arms 13 which are remotest from the associated inner ends 14 on the line dividing the short sides 7A, 7B. After the arms 13 have been raised in the direction as indicated by an arrow P, margins 45, 46 of the wiping sheet 5 may be placed above the respective recesses 16 followed by flattening the arms 13 to clamp the wiping sheet 5 between the top surface 10A and the arms 13 and thereby to fasten the wiping sheet 5 to the plate-like assembly 2. A specific example of the sheet 5 is made of nonwoven fabric, more preferably made of nonwoven fabric impregnated with synthetic detergent for wipe-out purpose and having a surface as fluffy as possible for easily catching dirt and/or dust.

The stick 4 is made of hard plastics and adapted to pivot in both directions as indicated by double-headed arrows Q, R.

Fig. 2 is a sectional view taken along a line II - II

in Fig. 1, in which one of the arms 13 is shown as being slightly raised. The elastic member 9 forming a part of the plate-like assembly 2 has a first peripheral side wall 31 in engagement with a flange 22 extending outward from a peripheral surface 21 of the main body 8. The peripheral surface 21 and the first peripheral side wall 31 are substantially integral with each other. The elastic member 9 covers the entire bottom surface 10A of the main body 8 so as to define a bottom surface 23 of the cleaner device 1. A plurality of ribs 24 are in contact with an inner surface of the elastic member 9. The elastic member 9 further comprises, outside the first peripheral side wall 31, a second peripheral side wall 30 having a proximal end portion 32 horizontally extending from a top of the first peripheral side wall 31 and an elastically deformable distal end portion (outermost edge) 33 extending downward from the proximal end portion 32 substantially in parallel to the first peripheral side wall 31. The distal end portion 33 is spaced from the first peripheral side wall 31 by a distance d.

Fig. 3 is a fragmentary perspective view showing the raised arm 13 and a portion of the plate-like assembly 2. The arm 13 is made of hard plastics and provided on a lower surface of an outer end 15 thereof with a male lock 35 in the

form of a latch adapted to be engaged with a female lock 36 provided on the main body 8 as the arm 13 is flattened. In addition to the male and female locks 35, 36, the lower surface of the arm 13 is formed on its transversely opposite sides with a pair of male locks 37, 38 extending downward. These male locks 37, 38 are vertically directed when the arm 13 is flattened and have saw-toothed distal ends. As the arm is completely flattened, the male locks 37, 38 are received by a pair of grooves 39, 40 formed in the respective recesses 16 so as to serve as female locks. Between the pair of grooves 39, 40, a male component 41 of so-called mechanical fastener comprising male and female fasteners and well known under the trade mark such as VELCRO is bonded to the main body 8.

With the device 1 constructed as has been described above, the user begins by raising the arms 13, then places the wiping sheet 5 against the bottom surface 23 of the plate-like assembly 2 and folds the margins 45, 46 (See Fig. 1) of the wiping sheet 5 extending outward beyond the respective long sides along the second side wall 30 of the elastic member 9 so as to be placed upon the top surface 10A of the plate-like assembly 2. The wiping sheet 5 is relatively wide so that the respective grooves 39 may be

covered with the margin 45 and the respective grooves 40 may be covered with the margin 46. Furthermore, the sufficient width of the wiping sheet 5 allows these margins 45, 46 to be fastened to the respective fasteners 41. After these margins 45, 46 have been fastened in this manner, the arms 13 may be flattened to hold the wiping sheet 5 between side walls 37A, 37B, 38A, 38B of the respective male locks 37, 38 and side walls 39A, 39B, 40A, 40B of the respective grooves 39, 40 and/or to catch the wiping sheet 5 by saw-toothed distal ends 37C, 38C of the respective male locks 37, 38. The wiping sheet 5 is thereby substantially fixed to the plate-like assembly 2. Consequently, there is no apprehension that the wiping sheet 5 might be unintentionally detached from the plate-like assembly 2 even if an object to be cleaned is violently rubbed with the wiping sheet 5. Additionally, the second peripheral side wall 30 of the elastic member 9 offers an advantageous effect for reliably attaching the wiping sheet 5 to the plate-like assembly 2. Specifically, the margins 45, 46 may be fastened to the fasteners 41 while the second peripheral side wall 30 is elastically deformed so as to tension the wiping sheet 5 transversely of the plate-like assembly 2 and then the clamping arms 13 may be flattened. As a result, the wiping sheet 5 is further tensioned under a

restoring force of the second peripheral side wall 30 and brought more closely in contact with the bottom surface 23 of the cleaner device 1.

Fig. 4 is a fragmentary sectional view taken along a line IV - IV in Fig. 3. The plate-like assembly 2 is formed in the top surface with the recesses 16 which are, in turn, formed in their bottoms 51 with second recesses 52, respectively, to mount the respective planar fasteners 41 therein. Each of these planar fasteners 41 has a base sheet 41A thereof fixed to a bottom surface 53 of the second recess 52 by means of adhesive or glue 54. A plurality of hooks 41B extending upward from the base sheet 41A are preferably dimensioned so that their upper ends do not extend upward beyond a bottom surface 51 of the recess 16 or the upper ends extend upward beyond the bottom surface 51 by less than 1 mm.

After the wiping sheet 5 has been repeatedly attached to and detached from the fasteners 41 of the cleaner device 1, a plurality of fibers falling off from the wiping sheet 5 may cling to the hooks 41B and contaminate them. With a consequence, the fasteners 41B may become ineffective to fasten the wiping sheet thereon. While the hooks 41B can be cleaned by repeatedly rubbing the hooks 41B with a relatively

hard brush, if the base sheet 41A of the fastener 41 is fixed to the bottom surface 51, the brush may repeatedly rub the base sheet 41A itself and the fastener 41 may be gradually peeled off from the bottom surface 51. According to the illustrated embodiment, on the contrary, the base sheet 41A of the fastener 41 is received in the second recess 52 slightly larger than the base sheet 41A and there is no apprehension that the brush might rub the base sheet 41. In this way, with the cleaner device 1 according to the invention, the fastener 41 can not be easily peeled off from the plate-like assembly 2.

With the cleaner device according to the invention, the troublesome operation of handling the clamp means with the user's one hand while the wiping sheet is tensioned with the user's other hand can be eliminated, since the plate-like assembly is provided on the top surface thereof with the clamp means used to clamp the wiping sheet as well as the planar mechanical fasteners and the wiping sheet can be previously fastened to the planar fasteners under a desired tension.

Practically entire thickness of the mechanical fasteners inclusive of their base sheets are received in the sufficiently deep recesses, so there is no apprehension that

these fasteners might be easily peeled off from the plate-like assembly even these fasteners are rubbed with the brush or the like.

WHAT IS CLAIMED IS:

1. A cleaner device comprising a plate-like assembly having a top surface, a bottom surface, clamp means provided on the top surface so that both side margins of a wiping sheet placed against the bottom surface may be folded back along both side edges of the plate-like assembly onto the top surface and clamped by said clamp means to detachably attach the wiping sheet to the plate-like assembly, the cleaner device being characterized in that:

the clamp means are mounted on the top surface of the plate-like assembly and arranged so as to clamp the wiping sheet in its regions defined between planar fasteners adapted to detachably fasten the wiping sheet and the both side edges of the plate-like assembly along which the wiping sheet is folded back, respectively.

2. A cleaner device according to Claim 1, wherein regions assigned on the top surface of the plate-like assembly to mount planar fasteners are recessed relatively to the top surface so that at least base sheets of the fasteners may lie at a level lower than the top surface surrounding the regions.



3. A cleaner device according to Claim 2, wherein the respective fasteners mounted on the plate-like assembly in the regions have their top ends lying at the same level as the top surface surrounding said regions or at a level lower than the top surface surrounding the regions.

