

CLEANER DEVICE

The present invention relates generally to a cleaner device and, more particularly, to a cleaner device such as a broom, a sweeper and the like, which is adapted to be detachably equipped with a cleaning sheet (inclusive of a whipping or sweeping sheet) and used to clean a floor or the like.

The cleaner device of such type is known, for example, from Japanese Patent Application Laid-Open No. Hei5-245091 according to which the cleaner device comprises a rectangular plate-like head and a stick mounted on an upper surface of the plate-like head, and a cleaning sheet is attached to the plate-like head by putting the cleaning sheet against a lower surface of the plate-like head, then folding marginal portions of the cleaning sheet along transversely opposite long sides of the plate-like head back onto the upper surface thereof and finally clamping the marginal portions by the clamping members provided on the upper surface of the plate-like head.

According to the prior art cleaner device, the sheet clamping members are rotated around a hinge-mechanism to be opened and closed. The sheet clamping members are opened

upward prior to operation of cleaning sheet attachment and has no means to hold the sheet clamping members in their opened positions and, consequently, the operation of cleaning sheet attachment is often obstructed by the sheet clamping members being unintentionally closed.

In view of the problem as has been described above, it is a principal object of the invention to provide a cleaner device equipped with an exchangeable cleaning sheet and equipped with means to hold sheet clamping members at their opened positions during operation of the cleaning sheet attachment.

The object set forth above is achieved, according to the invention, by a cleaner device comprising a rectangular plate-like head defined by two mutually orthogonal pairs of parallel sides, a stick mounted on an upper surface of the plate-like head and a cleaning sheet detachably attached to the plate-like head, wherein:

means for detachably attaching the cleaning sheet to the plate-like head comprise a pair of sheet clamping members provided at transversely symmetric positions on the upper surface of the plate-like head and having respective base ends opposed to each other on a line bisecting one of the two

pairs of parallel sides and locking means formed in the upper surface of the plate-like head adapted to be releasably engaged with the sheet clamping members, respectively;

the pair of sheet clamping members are pivotally mounted at the base inner ends thereof on the upper surface of the plate-like head so that marginal portions of the cleaning sheet can be inserted between the sheet clamping members and the upper surface of the plate-like head after the sheet clamping members have been pivotally opened upward from the upper surface of the plate-like head and the sheet clamping members can be brought into engagement with the locking means provided in the upper surface of the plate-like head so as to hold the inserted marginal portions of the cleaning sheet between the sheet clamping members and the upper surface of the plate-like head as the sheet clamping members are closed; and

each of the sheet clamping members is formed on the base end thereof with a projection adapted to swing around a pivot shaft of the associated sheet clamping member so as to describe a circular arc as the sheet clamping member swings while the plate-like head is formed at a region underlying the projection with a spring adapted to be elastically deformed in a vertical direction as the projection comes in

engagement with the spring during movement of the projection so that the projection can reach a turning point relative to the spring as the sheet clamping member is opened by a desired angle.

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

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

Fig. 3 is a fragmentary perspective view of a plate-like head as a sheet clamping member being in opened state;

Fig. 4 shows respective parts in Fig. 2 and sequentially illustrates, by (A), (B) and (C), a manner in which the sheet clamping member swings upwards from its closed position to its opened position; and

Fig. 5 is a view similar to Fig. 2, exemplarily showing a manner in which a cleaning sheet is clamped.

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

A cleaner device 1 shown by Fig. 1 in a perspective

view comprises a plate-like head 2 and a stick 4 connected by a universal joint 3 of well known art to the plate-like head 2, and a cleaning or whipping or sweeping sheet 5 (hereinafter referred to "cleaning sheet") is attached to the plate-like head as shown by imaginary lines. The cleaning sheet 5 is made of nonwoven fabric or the like.

The plate-like head 2 is configured in a rectangle defined by a pair of long sides 7A extending transversely with respect to the course of cleaning operation and a pair of short sides 7B connecting the long sides 7A. The plate-like head 2 comprises a main body 8 made of hard plastic material and an elastic plate member 9 made of soft elastic material such as plastic and rubber and covering a peripheral wall and a bottom surface (Fig. 2) of the main body 8. An upper surface 10 of the main body 8 is centrally provided on a line bisecting the pair of short sides 7B with a pair of transversely adjacent projections 11 for mounting the universal joint 3 and provided between the respective short sides 7B and the respective projections 11 with recesses 16. The respective recesses 16 have substantially entire areas thereof covered with respective sheet clamping members 13 which are pivotable around base ends 14 thereof relatively to the main body 8. The sheet clamping members 13 may be opened

or closed relatively to the associated recesses 16 with free ends 15 thereof located aside toward the respective short sides 7B being held. After these sheet clamping members 13 have been opened in a direction as indicated by an arrow P, marginal portions of the cleaning sheet 5 may be folded onto the upper surface 10 of the main body 8 followed by closing the sheet clamping members 13 to hold the cleaning sheet 5 between the upper surface 10 and the respective sheet clamping members 13 in an unremovable state.

The stick 4 is made of hard plastic material and pivotable in two directions as indicated by double-headed arrows Q and R.

Fig. 2 is a sectional view taken along line II-II in Fig. 1 and shows one of the sheet clamping members 13 as being in an opened position thereof. In the plate-like head 2, the elastic plate member 9 has an inner peripheral side wall 31 tightly engaged with a flange 22 formed along a peripheral wall 21 of the main body 8 so that the peripheral wall 21 and the side wall 31 are substantially integral with each other. The elastic plate member 9 completely covers a lower surface of the main body 8 and thereby forms a lower surface 23 of the plate-like head 2. A plurality of ribs 24 project downward from a lower surface of the main body 8 and

bear against an inner surface of the elastic plate member 9 from above. The elastic plate member 9 includes, in addition to the inner peripheral side wall 31, an outer peripheral side wall 30 having an inverted L-shaped cross-section extending outside the inner peripheral side wall 31. The outer peripheral side wall 30 comprises an inner section 32 located above the inner peripheral side wall 31 of the elastic plate member 9 and an outer section 33 slightly extending outward from said inner section 32 and then extending downward so that said outer section 33 is spaced from the side wall 31 by a distance d.

Fig. 3 is a fragmentary perspective view of the plate-like head 2, in which the sheet clamping member 13 is in an opened state. The sheet clamping member 13 is made of hard plastic material and includes a locking jaw 36 formed on a lower surface of the free end 15. The locking jaw 36 is adapted to be engaged with a locking means 37 formed on the main body 8 in a latch fashion as the sheet clamping member 13 is closed. A lower surface of the sheet clamping member 13 is formed on transversely opposite sides thereof with a pair of locking means 37, 38 extending downward and having forward ends in the form of sawteeth. These locking means 37, 38 are firmly inserted into a pair of slots 39, 40 formed in

the upper surface 10 of the main body 8 as the sheet clamping member 13 is closed. A strip of hook tape 41, one component of paired fastener tape known under the trade mark VELCRO, is affixed to the main body 8 between the slots 39, 40.

The base end 14 of each clamping member 13 is provided on an inner side thereof with a projection 53 adapted to extend horizontally when the sheet clamping member 13 has been opened to a substantially vertical position thereof as shown but to extend vertically down toward the upper surface of the plate-like head 2 when the sheet clamping member 13 has been closed. The plate-like head 2 has a cantilever spring 56 formed by cutting a square U-shaped portion away from the plate-like head 2 so that the projection 53 may bear against this cantilever spring 56 as the projection 53 rotates to a vertically extending position thereof. The spring 56 has a base end 57 thereof lying aside toward the short side 7B and a free end 58 thereof extending toward the middle of the plate-like head 2.

Fig. 4 shows respective parts in Fig. 2 and sequentially illustrates, by (A), (B) and (C), a manner in which the sheet clamping member 13 swings upwards from a closed position to a opened position thereof. In a state shown by (A), the sheet clamping member 13 is securely latch-

engaged with the main body 8 and the projection 53 formed on the base end of the sheet clamping member 13 is out of contact with the spring 56 making a part of the main body 8 or slightly in contact therewith. In a state shown by (B), a tip 53A of the projection 53 has described a circular arc and has depressed a curved ramp-like portion 56A of the spring 56 from the left side, as viewed in Fig. 4, as the sheet clamping member 13 has been opened by approximately 45° . In this state, the clamping member 13 has reached so-called turning point relative to the spring 56 and stopped at this point. From this turning point, the sheet clamping member 13 will rapidly swing in a closing direction X thereof merely with a slight downward force exerted thereon and will rapidly swing in an opening direction Y thereof merely with a slight upward force exerted thereon. Finally, in a state shown by (C), the clamping member 13 has been opened by approximately 90° and the projection 53 is slightly in contact with the spring 56 or not in contact therewith. The sheet clamping member 13 having been opened to this position can not be closed unless the sheet clamping member 13 is affected by a force sufficient to cause the clamping member 13 to pass through the turning point.

Operation of the device 1 constructed as has been

described above begins with opening the sheet clamping members 13. Then, the cleaning sheet 5 is put over the lower surface 23 of the plate-like head 2 and transversely opposite marginal portions 45, 46 (Fig. 1) are folded onto the upper surface 10 of the plate-like head 2 so that the marginal portion 45 may cover the slot 39 and the marginal portion 46 may cover the slot 40. These marginal portions 45, 46 are fastened to the strip of hook tape 41. Then the sheet clamping sheet members 13 are closed to hold the cleaning sheet 5 between side walls of the locking means 37, 38 and side walls of the slots 39, 40. Simultaneously, the cleaning sheet 5 is engaged with the sawteeth forward ends of the locking means 37, 38. Such double fastening effect ensures that the cleaning sheet 5 is never removed from the plate-like head 2 during operation of cleaning a house floor or the like.

Since there is no apprehension that the sheet clamping member 13 might be readily closed so far as the clamping member 13 has been opened by an angle sufficient to pass through the turning point, the marginal portions 45, 46 can be successively and reliably fastened to the strip of hook tape 41 to attach the cleaning sheet 5 to the main body 8.

Fig. 5 shows the plate-like head 2 onto the upper

surface of which the marginal portions 47, 48 of the cleaning sheet 5 have been folded along the short sides 7B and clamped by the sheet clamping members 13. The cleaning sheet 5 which is relatively wide can be economically used by attaching it to the plate-like head in a manner as illustrated. It should be understood that the cleaning sheet 5 is disposed between the locking jaws 35 provided on the sheet clamping members 13 and the locking jaws 36 provided on the main body 8. Also when attachment of the cleaning sheet 5 is carried out in such manner, sheet attachment can be easily performed since there is no apprehension that the sheet clamping members might be readily closed during operation of sheet attachment.

With the cleaner device according to the invention, the sheet clamping members which have been completely opened once are not readily closed and, therefore, operation of sheet attachment can be easily performed without any anxiety.

The entire disclosure of Japanese Patent Application No. Hei8-74866 filed on March 28, 1996 including specification, claim, drawings and abstract are incorporated herein by reference in its entirety.



What is Claimed is:

1. A cleaner device comprising a rectangular plate-like head defined by two pairs of mutually parallel side walls, a stick mounted on an upper surface of the plate-like head and a cleaning sheet detachably attached to said plate-like head so as to cover a bottom surface of the plate-like head, wherein:

means for detachably attaching the cleaning sheet to the plate-like head comprise a pair of sheet clamping members provided at transversely symmetric positions on the upper surface of the plate-like head and having respective base ends opposed to each other on a line bisecting one of the two pairs of mutually parallel sides and locking means formed in the upper surface of the plate-like head adapted to be releasably engaged with the sheet clamping members, respectively;

the pair of sheet clamping members are pivotally mounted at the base ends thereof on the upper surface of the plate-like head so that marginal portions of the cleaning sheet can be inserted between the clamping members and the upper surface of the plate-like head after the sheet clamping members have been pivotally opened upward from the upper



surface of the plate-like head and the sheet clamping members can be brought into engagement with the locking means provided in the upper surface of the plate like head so as to hold the inserted marginal portions of the cleaning sheet between the sheet clamping members and the upper surface of the plate-like head as the sheet clamping members are closed; and

each of the sheet clamping members is formed on the base end thereof with a projection adapted to swing around a pivot shaft of the sheet clamping member so as to describe a circular arc as the sheet clamping member swings while the plate-like head is formed at a region thereof underlying the projection with a spring adapted to be elastically deformed in a vertical direction as the projection comes in engagement with the spring during movement of the projection so that the projection may reach a turning point relative to the spring as the clamping sheet member is opened by a desired angle.

2. A cleaner device according to Claim 1, wherein the plate-like head comprises a main body made of head plastic material and an elastic plate member covering a bottom surface and a peripheral wall of the main body and made of soft elastic material.



3. A cleaner device according to Claim 1, wherein the plate-like head is formed on the upper surface thereof with recesses having substantially entire areas thereof covered with the respective sheet clamping member.

4. A cleaner device according to Claim 1, each of the sheet clamping members are formed on transversely opposite sides of a lower surface thereof with a pair of second locking means extending downward, and each of the recesses is formed on transversely opposite sides a pair of slots into which the second locking means are inserted.

5. A cleaner device according to Claim 4, wherein each of the recesses are provided between the pair of slots with a strip of hook tape.