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(72) Inventor: **Cassar, Simon Ralph**
Oregon City, Oregon 97045 (US)

(74) Representative: **Silverman, Warren et al**
Haseltine Lake & Co.
Imperial House,
15-19 Kingsway
London WC2B 6UD (GB)

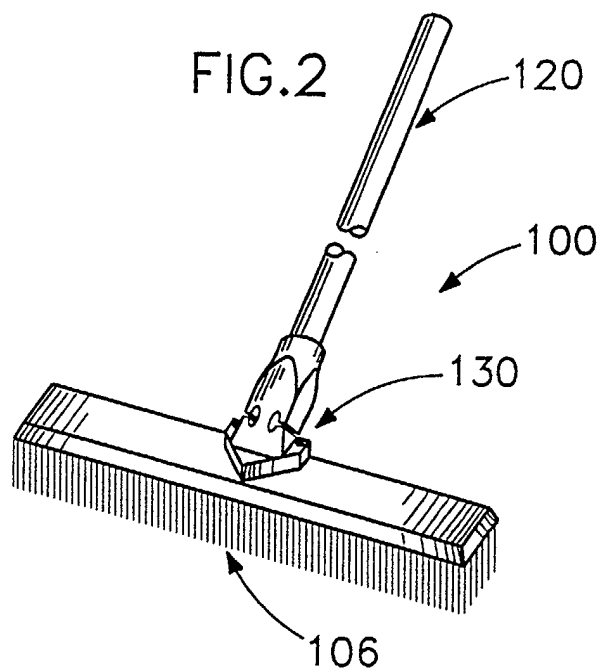
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(71) Applicant: **Cassar, Simon Ralph**
Oregon City, Oregon 97045 (US)

(54) **Flexible attachment mechanism for controlling the downward flexing of a broom head of a push broom and flexible insert with stop limits for brush broom handles**

(57) A flexible attachment mechanism used in conjunction with push brooms having a broom handle and a broom head to provide a flexible attachment mechanism at the junction where the broom handle is connected to the broom head. The flexible attachment mechanism allows the broom head to flex up and down causing

the flexible attachment mechanism to be pre-loaded when pushing with the broom handle and upon releasing the downward movement during a normal sweeping action, the pre-loaded flexible attachment mechanism springs up, which in turn causes the broom head to spring upwardly to kick the debris further away from the broom head.



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Description

[0001] The present invention relates to a cleaning or sweeping apparatus and in particular, to brooms or applications where material is being removed by an apparatus. The present invention further relates to insert adjustments which can enhance the ease of use and cleaning capability of brooms. In particular, the present invention relates to a cleaning apparatus or the like having the capability of up and down flexing for providing improved sweeping action.

[0002] The standard brush broom has two primary components. The first component is the head that comprises a rectangular piece of material usually made of wood that supports therein a multiplicity of bristles of fibers that extend transversely to the head. The second primary component of the brush broom is the handle which is usually a cylindrical pole that is rigidly although sometimes removably affixed to the top of the head in the manner which permits the brush broom to be pushed and pulled by the exertion of a force on the handle.

[0003] One significant problem with brush brooms especially when used in confined spaces is that the rigid nature of the connection between the handle and head causes difficulty in sweeping adjacent doorways, corners, tables, chairs and other areas where obstacles are placed on the floor. The edge of the broom head hits the obstacle straight on and then it is necessary to stop the sweeping action and reorient the push broom to avoid or go around the obstacle. In addition, if the force of the sweeping action is sufficiently strong, the head-on impact of the brush broom could cause damage to the object being hit, inflict injury to the operator or break the push broom handle. The reason for the damage is due to the moment between the handle and broom head length which causes a fulcrum effect. To overcome this problem prior art has been developed to allow the brush broom to be flexible at the joint between the brush broom and the pole handle. However, to effectively have a workable flexible brush broom, it must have stops to limit the amount of flex and the attachment must be rectangular in shape along the longitudinal axis to retain the rigidity in the longitudinal axis while being flexible in the lateral axis.

[0004] Patents on mechanisms or attachments that allow for a flexible joint between the brush broom and broom handle are old in the prior art. However, to date all prior art devices are either too costly to manufacture due to the expense of springs and their installation into the broom head (e.g., patents 3,506,996 and 4,785,489) or as in the case of polymeric or polyurethane adapter patents 4,722,634 and 5,333,345, have excessive flex which causes a wobble effect because the flexible attachments are not rectangular in shape and had no limit stops. The prior art devices allow the broom to have excessive lateral movement when in contact with a stationary object thus causing the contents to be swept, instead of being retained in the brush

broom bristles, due to the excessive angle of the brush broom in relation to the broom handle. In addition, without stop limits, the prior art devices allow the flex member to go beyond the stress limit of the flexible insert material, causing the flexible membrane to crack and eventually break, thus rendering it ineffective. In addition, the prior art flexible insert attachments are not rectangular in shape along the longitudinal axis which is critical to reduce stress to the flexible member yet allow for lateral movement and retain the rigidity in the forward and aft movements. The cylindrical attachment described in the prior art causes the flexible member to flex in both the lateral direction and longitudinal direction making the broom head unstable. In addition, Patent 5,333,345 uses a polyurethane flexible material and requires flanges to be encapsulated into the polyurethane elastomer material, thus making the adapter cost prohibitive for residential and commercial brooms.

[0005] Therefore, a significant need exists to improve upon the previous prior art patents and to allow for a flexible attachment to be made that is rectangular in shape and has stop limits, thus eliminating stress to the flexible apparatus yet limiting the wobble effect of a flexible mechanism/attachment both in the lateral and longitudinal axis. It is also desirable to manufacture a brush broom that is flexible so that corners, doorways and obstacles on the floor can be more easily negotiated when it is necessary to sweep adjacent or around them.

[0006] It is further desirable to have a very efficient and also very effective design and construction of a cleaning apparatus for controlling the up and down flexing of the cleaning head to provide an improved sweeping action.

[0007] The present invention is a mechanism that is affixed at the location between the brush handle and the head of the brush broom to provide a flexible member at the junction where the handle is attached to the head. Through use of the flexible member and predetermined stop limits, the handle maintains rigidity in the direction in which it is moved but is flexible in the lateral direction up to the predetermined limits of the stops. Therefore, when the brush broom comes in contact with a stationary object, the broom will only flex up to the stress limit of the flexible material due to the stop limits yet have sufficiently enough movement to reduce hand injury to the operator or damage to the structure or brush broom handle.

[0008] It has been discovered that all elastomer materials have certain flexible characteristics that cannot be controlled unless physical stops have been incorporated into the design of the apparatus. According to the present invention, the design incorporates a positive stop to eliminate the broom head from flexing beyond the limits of the memory of the material. In addition, the stop limits allow for control of the flexible movement, thus eliminating a wobble effect when the broom head goes out of control and makes the broom head unusable for cleaning purposes.

[0009] It has been further discovered that to reduce stress to the material yet retain rigidity in the back and forward movements, flexible materials having a flexible memory such as molded rubber, plastic or even formed metals perform best when they are rectangular in shape, when seen in a cross-sectional view along the longitudinal Z axis with the long side of the rectangle being forward and aft and the short side being inboard and outboard as shown in figure 3 item 18. This configuration allows for maximum flexibility in the lateral movement yet has rigidity in the back and forward movements.

[0010] According to the present invention there is provided an apparatus by which a conventional brush broom can efficiently utilize a flexible insert that has controlled limits and can be economically manufactured.

[0011] The present invention also provides an insert that can be adapted to existing brush brooms to provide controlled flexibility.

[0012] The present invention further provides an insert which can be attached to the forward end of the handle to thereby provide the option of manufacturing a handle with the insert attached which can be affixed to the top of the head of a brush broom.

[0013] Alternatively, the present invention is a flexible attachment mechanism used in conjunction with push brooms having a broom handle and a broom head to provide a flexible attachment mechanism at the junction where the broom handle is attached to the broom head. The flexible attachment mechanism allows the broom head to flex up and down causing the flexible attachment mechanism to be pre-loaded when pushing with the broom handle and upon releasing the downward movement during a normal sweeping action, the pre-loaded flexible attachment mechanism springs up, which in turn causes the broom head to spring upwardly to kick the debris further away from the broom head.

[0014] The present invention also provides a flexible attachment mechanism which can be adapted for connecting a push broom head to a push broom handle and thereby forms a complete cleaning apparatus.

[0015] The present invention further provides a flexible attachment mechanism that can be adapted for controlling the up and down flexing of the cleaning head to provide an improved sweeping action.

[0016] The flexible attachment mechanism may be made of an elastomeric material.

[0017] The flexible attachment mechanism may be integrally formed with a push broom head.

[0018] Further novel features and other objects of the present invention will become apparent from the following detailed description, discussion and the appended claims, taken in conjunction with the drawings.

[0019] Referring particularly to the drawings for the purpose of illustration only and not limitation, there is illustrated:

FIG. 1 is a perspective view of the preferred embodiment of the present invention insert apparatus at-

tached to the top of the head and attached adjacent to the forward end of the handle of the brush broom.

FIG. 2 is a perspective view of the preferred embodiment of the present invention insert apparatus attached to the top of the head and attached adjacent to the forward end of the handle of a brush broom.

FIG. 3 is a cross-sectional view looking down along line 3-3 of FIG. 1.

FIG. 4 is a front elevational view of the preferred embodiment of the present invention insert apparatus illustrating the movement of the attachment and the use of the control stop limits when the brush broom comes in contact with a stationary object.

FIG. 5 is a side elevational view of the preferred embodiment of the present invention insert apparatus attached to the top of the head and attached adjacent to the forward end of the handle of a brush broom.

FIG. 6 is a front elevational view as shown in FIG. 1, showing a partial cross section of a preferred embodiment and an alternative embodiment of the attachment method of the present invention.

FIG. 7 is an isometric view of the present attachment.

FIG. 8 is an isometric view of the alternative embodiment.

FIG. 9 is a perspective view of an alternative embodiment of the present invention flexible attachment mechanism.

FIG. 10 is a cross-sectional view taken along line 10-10 of FIG. 9.

FIG. 11 is a side elevational view of the present invention flexible attachment mechanism connected between a push broom head and a push broom handle to form a complete broom apparatus.

FIG. 12 is a partial rear plan view of the complete broom apparatus.

FIG. 13 is an illustration showing the sweeping action of the present invention flexible attachment mechanism.

FIG. 14 is a side elevational view of the present invention flexible attachment mechanism without a downward limit stop member.

FIG. 15 is a partial cross-sectional view of an alter-

native embodiment of the present invention flexible attachment mechanism.

FIG. 16 is a side elevational view of the present invention flexible attachment mechanism shown in FIG. 15.

[0020] Although specific embodiments of the present invention will now be described with reference to the drawings, it should be understood that such embodiments are by way of example only and merely illustrative of but a small number of the many possible specific embodiments which can represent applications of the principles of the present invention. Various changes and modifications obvious to one skilled in the art to which the present invention pertains are deemed to be within the spirit, scope and contemplation of the present invention as further defined in the appended claims.

[0021] Referring to figure 1, there is shown at 10 the present invention flexible stop controlled insert member acting as a stop limit mechanism. In the preferred molded embodiment, the flexible insert member 10 comprises a longitudinal section 14 and a lateral section 16 that are interconnected through an arcuate connecting section 18. In general appearance, the one piece molded insert looks like a pyramid shaped object with two elongated holes 19 and 20 that are open on both the left and right outboard side of the insert with the top portion of the triangle pyramid shape having a circular receptacle to receive the broom handle. The alignment and shape of the two elongated holes 19 and 20 are symmetrical and extend away from each other. The overall configuration of the flexible control stop member 10 resembles an inverted "T" with the mid portion of the vertical leg being thin in the middle and the lower and top portions of the leg being thick and wide thus allowing for control stops. The singular molded body unit has two symmetrical open-ended cavities 19 and 20. Each cavity is arcuate in design and forms tops 21 and 22 and bottoms 24 and 23 stop pads that lie around the lateral axis. The gap between the stop pads 21, 24 and 22, 23 respectively, can vary to allow the brush broom head to flex between 3 degrees to up to 75 degrees depending on the application type of the brush broom type. Typically, the gap distance between the stop limits is set to allow no more than 30 degrees broom head to broom handle deflection.

[0022] When the broom head comes in contact with an object, the lower stop pad 23 will come in contact with stop pad 22 thus causing the broom head not to continue the flex movement and thus reducing debris loss during sweeping.

[0023] In the embodiment illustrated in figure 6, the lower base mount portions 26 and 16 protrude upward and merge into a cylindrical sleeve portion. The upper cylindrical portion extends upwardly and outwardly preferably at an angle of inclination of approximately 45 degrees in relation to the base mount as shown in figure

5, item "A". Accordingly, the upper sleeve portion of the cylindrical sleeve section 130 includes an axial bore 140 having a uniform dimension so as to receive the transverse dimension of the handle 120. The thickness of the material encapsulating handle 120 is sufficient to not crack when impact to the head of the broom occurs. The upper sleeve section 130 has a diameter to tightly receive in a generally slip-fit relationship the transverse dimension of the handle to frictionally retain the handle therein.

[0024] In the preferred embodiment, the insert member 10 is made of any flexible substance with memory such as rubber, plastic, titanium, and polyvinyl. It is also within the spirit and scope of the present invention for the attachment to be made of flexible but strong plastic such as Mylar®, polypropylene or any other flexible material exhibiting the required characteristics.

[0025] The preferred embodiment of the present invention is shown in use in figures 1, 2, 3, 4 and 6. The conventional brush broom 100 comprises a head member 102 and a handle 120. The head 102 in turn comprises a top surface 104 and a bottom surface 106. The bottom surface 106 supports a multiplicity of bristles or fibers 108 that are cut so as to be aligned in the same plane 110 when the head 102 is flush against the floor during a sweeping operation. The handle 120 is an elongated member that in the preferred embodiment for ease of gripping is a pole. When fitted with the preferred embodiment of the insert apparatus 10, the handle 120 is encapsulated into recess 140 which is of sufficient length to accommodate a sufficient length of the longitudinal handle 120. The molded apparatus is comprised of left and right recessed cavities 27 and 28 respectively that are open on both sides of the embodiment that form the upper and lower left side stops 21 and 24 and right side stops 22 and 23. The two recessed cavities share the same back portion of the cavity that forms the rectangular flexible member 18. The recessed cavities are elongated along the Y axis to allow for the member to flex in the lateral movement as shown in figure 4. Lower stops 24 and 23 of the flexible insert member form the base of the attachments 26 and 16. The base of the attachment is supported onto the broom head by screws 150, 151 and 152 that connect the attachment to the broom head.

[0026] In order to facilitate the ease of motion for the sweeper, the longitudinal section 14 (and flexible member 18) is offset at an angle relative to its respective lateral sections 26 and 16. As illustrated in figure 5, the preferred relative angle "A" is approximately 45 degrees, although any angle from approximately 15 degrees to approximately 80 degrees is allowed.

[0027] An alternative embodiment for the base of the attachment is illustrated in figures 5 and 6. In this embodiment, the bases 26 and 16 are attached to the brush broom head by two bolts 30 and 32 that are inserted through the broom head bottom adjacent to the bristles as shown in figures 6 and 5, and connect the attachment

to the brush broom head with wing nuts 29 and 31. As in the preferred embodiment, the stop limit mechanism is identical in design and material as to the aforementioned alternative embodiment.

[0028] An alternative embodiment is identical to the preferred embodiment with the flexible member having a rectangular shaped flexible member as indicated in figure 3, item 18 and being a one-piece unitary molded attachment. The difference between the preferred attachment and the alternative attachment is that the stop limits have been removed as indicated in figure 8.

[0029] Defined broadly, the present invention is a flexible insert member with stop limits that is attached to one end of a brush broom handle and attached to the head of the brush broom to thereby provide a controlled flexible connection between the handle and head of the brush broom, the flexible insert being rigid in the longitudinal direction to permit the handle to cause the broom head to move back and forth and the flexible insert being flexible with stop limits in the lateral direction to thereby permit the handle to flex laterally with respect to the head of the brush broom.

[0030] Therefore, through use of the present invention, a flexible sweeper can be manufactured that is economical and durable and thus allow a person doing the sweeping to sweep liberally and freely without worry of nicking or denting furniture and household trim along with reducing hand injury due to sudden broom impact. At the same time, the brush broom has the rigidity to push or pull large loads without flexing beyond a predetermined degree via the stop limits. The life of the broom handle is also increased.

[0031] Referring to Figures 9, 10 and 11, there is shown alternatively at 210 the present invention flexible attachment mechanism used in conjunction with a conventional push broom apparatus which includes a push broom head 202 and a push broom handle 204, where the flexible attachment mechanism acts as a stop limit mechanism in the down movement of the push broom head. The push broom head 202 includes a top surface and a bottom cleaning surface which has a plurality of bristles or fibers 206 that are flush against the floor during a sweeping action.

[0032] The flexible attachment mechanism 210 is molded from a unitary elastomeric material and includes an inclined longitudinal section 214, a lateral mounting section 216 and an arcuate connecting section 218 (see Figure 12) which interconnects the longitudinal and lateral sections together. Specifically, the flexible attachment mechanism 210 is generally a pyramid-shaped object with two elongated symmetrical through openings 219 and 220 located on both sides of the connecting section 218. The longitudinal section 214 has a circular axial bore 240 with an open end 244. The axial bore is a uniform bore for receiving the broom handle 204, where the broom handle 204 is press-fitted thereto. The lateral section 216 is attached to the top surface of the push broom head 202 by conventional bolts and nuts.

The bolts 250 are inserted through the bottom surface of the broom head 202 and through bores in the mounting section 216 of the flexible attachment mechanism 210 and secured thereto by two corresponding wing nuts. The mounting section 216 may be secured by at least two threaded bolts respectively inserted through the top of the mounting section 216 and threadably engaged with the broom head 202 for securing the broom head 202 to the flexible attachment mechanism 210.

[0033] Referring to Figures 9 and 12, each of the through openings 219 and 220 is arcuate in shape and forms top stop pads and bottom stop pads that lie around the lateral axis. The gap between the stop pads can vary to allow the broom head to flex between 3° to up to 75° depending on the application type of the push broom. Typically, the gap distance between the upper and lower stop pads is set to allow no more than 30° broom head to broom handle deflection. When the broom head comes in contact with an object, the lower stop pad will come in contact with the upper stop pad, thereby causing the broom head not to continue the flex movement and reducing debris loss during sweeping.

[0034] In order to facilitate the ease of motion for the user, the longitudinal section 214 and the flexible connecting section 218 is offset at an angle of approximately 45°, preferably a range of approximately 15° to 80° can be used.

[0035] Referring to Figures 10, 11, 12 and 13, the flexible attachment mechanism 210 further comprises a downward limit stop member 260 which is integrally molded to the rear of the connecting section 218, where a gap 262 is formed between the limit stop member 260 and the rear end of the broom head 202 and an open cavity 264 is formed between the top of the broom head 202 and the underside of the flexible attachment mechanism 210. The downward limit stop member 260 extends downwardly and located half the thickness of the broom head 202 as shown in Figure 11.

[0036] The flexible attachment mechanism 210 allows the broom head 202 to move in a downward motion which causes the mechanism to be pre-loaded when a user pushes down on the broom handle 204 and upon releasing the downward pressure during a normal sweeping action, the pre-loaded flexible attachment mechanism 210 will spring up the broom head 202 causing the debris in front of the broom head to be lifted up and pushed further away from the broom head. The stop limit member 260 of the flexible attachment mechanism 210 controls the amount of flexing in the downward direction to ensure that the broom head 202 does not move down more than 75° when the user pushes down on the broom handle 204. If the downward flexing is not controlled, the broom head will flex too far causing the bristles to not make sufficient contact with the floor and debris being pushed. The limit stop member 260 engages with the rear end of the broom head 202, thereby stopping any further movement of the flexible attachment mechanism 210.

[0037] The present invention conforms to conventional forms of manufacture or any other conventional way known to one skilled in the art, and is of simple construction and is easy to use. The flexible attachment mechanism 210 can be made from several materials. The manufacturing process which could accommodate the construction of the flexible attachment mechanism may be injection, thermoform, etc. or other molding process. By way of example, the flexible attachment mechanism 210 can be made of any flexible substance with memory such as rubber, plastic, titanium, and polyvinyl. It will also be appreciated that the flexible attachment mechanism 210 can be made of flexible but strong plastic such as Mylar®, polypropylene or any other flexible material exhibiting the required characteristics.

[0038] Referring to Figure 14, there is shown the present invention flexible attachment mechanism used in conjunction with a conventional push broom apparatus. In this embodiment, the flexible attachment mechanism 210 can be manufactured with or without a downward limit stop member 260.

[0039] Referring to Figures 15 and 16, there is shown an alternative embodiment of the present invention flexible attachment mechanism 310 which is integrally formed with a push broom head 302.

[0040] Defined in detail, the present invention is a push broom, comprising: (a) an elongated laterally disposed broom head having a top surface and a bottom cleaning surface, the bottom cleaning surface having a plurality of bristles extending downwardly therefrom; (b) a unitary flexible attachment mechanism having a mounting section, an inclined longitudinal section, and a flexible connecting section integrally connecting the mounting section and the longitudinal section together, the mounting section centrally affixed to the top surface of the broom head such that the longitudinal section extends upwardly and outwardly to form an angle relative to the mounting section, the longitudinal section having an axial bore with an open end; (c) an elongated broom handle having one end press-fitting from the open end and secured within the axial bore of the longitudinal section of the flexible attachment mechanism; (d) the flexible connecting section having a pair of recesses located on opposite sides and extending the width of the flexible connecting section, each recess forming an upper engagement pad and a lower stop limit pad, where the upper engagement pad and its respective lower stop limit pad form a predetermined gap for allowing lateral flexing of the longitudinal section and the broom handle; and (e) a downward stop limit member integrally molded with the attachment mechanism and extending downwardly from the connecting section and engageable with a rear end of the broom head, where the downward stop limit member controls the amount of downward flexing of the connecting and longitudinal sections in the downward direction; (f) whereby the attachment mechanism is pre-loaded when a user pushes down on the broom handle causing the connecting and longitudinal sections to flex

downward and upon releasing the downward pressure during a normal sweeping action, the pre-loaded flexible attachment mechanism springs up the broom head causing the debris in front of the broom head to be lifted up and pushed further away from the broom head.

[0041] Defined broadly, the present invention is an attachment member to be used in conjunction with a push broom having a handle member and a laterally disposed cleaning head member with a top surface, a bottom surface and a plurality of bristles attached to the bottom surface and extending downwardly therefrom, the attachment member comprising: (a) a unitary flexible body having a mounting section, a longitudinal section and a flexible connecting section integrally connecting the mounting section and the longitudinal section together, the longitudinal section having an axial bore with an open end for receiving and securing one end of the handle member thereto; (b) the flexible connecting section having a pair of through recesses located on opposite sides and extending the width of the flexible connecting section, each recess forming an upper engagement pad and a lower stop limit pad, where the upper engagement pad and its respective lower stop limit pad form a predetermined gap for allowing a predetermined angle of lateral flexing of the longitudinal section and the handle; (c) means for attaching the mounting section to the top surface of the head member of the push broom; and (d) a downward stop limit member integrally formed with the unitary flexible body and extending downwardly from the connecting section for engaging with the head member, where the downward stop limit member controls the amount of downward flexing of the connecting and longitudinal sections in the downward direction; (e) whereby the unitary flexible body of the attachment member is pre-loaded when a user pushes down on the handle member causing the connecting and longitudinal sections to flex downward and upon releasing the downward pressure during a normal sweeping action, the pre-loaded flexible body of the attachment member springs up the head member causing the debris in front of the head member to be lifted up and pushed further away from the head member.

[0042] Defined more broadly, the present invention is an attachment member to be used in conjunction with a cleaning apparatus having a cleaning head and a handle, the attachment member comprising: (a) a flexible body having a mounting section for mounting to the cleaning head, a longitudinal section for receiving and securing one end of the handle thereto, and a connecting section interconnecting the mounting section and the longitudinal section together; (b) the connecting section having a thickness which is thinner than the thickness of the mounting section and the longitudinal section for allowing a predetermined angle of lateral flexing of the connecting section with the longitudinal section; (c) means for attaching the mounting section to the cleaning head of the cleaning apparatus; and (d) means for limiting the downward flexing of the connecting sec-

tion and the longitudinal section, where the limiting means controls the amount of downward flexing; (e) whereby the body of the attachment member is pre-loaded when a user pushes down on the handle causing the connecting and longitudinal sections to flex downward and upon releasing the downward pressure during a normal sweeping action, the pre-loaded body of the attachment member springs up the cleaning head causing the debris in front of the cleaning head to be lifted up and pushed further away from the cleaning head.

[0043] Defined even more broadly, the present invention is an attachment member to be used in conjunction with a cleaning apparatus having a cleaning head and a handle, the attachment member comprising: (a) a flexible body having a mounting section for mounting to the cleaning head, a longitudinal section for receiving and securing one end of the handle thereto, and a connecting section interconnecting the mounting section and the longitudinal section together; (b) means for attaching the mounting section to the cleaning head of the cleaning apparatus; and (c) means for limiting the downward flexing of the connecting section and the longitudinal section, where the limiting means controls the amount of downward flexing; (d) whereby the body of the attachment member is pre-loaded when a user pushes down on the handle causing the connecting and longitudinal sections to flex downward and upon releasing the downward pressure during a normal sweeping action, the pre-loaded body of the attachment member springs up the cleaning head causing the debris in front of the cleaning head to be lifted up and pushed further away from the cleaning head.

[0044] Further defined in detail, the present invention is a brush broom, comprising: (a) an elongated laterally disposed head member having a top surface and a bottom surface; (b) a plurality of bristles each having one end affixed to the bottom surface of the head member and extending downwardly therefrom; (c) a unitary flexible insert member having a mounting section, an inclined longitudinal section and a flexible connecting section integrally connecting the mounting section with the longitudinal section, the mounting section centrally affixed to the top surface of the head member such that the longitudinal section extends upwardly and outwardly to form an angle relative to the mounting section, the longitudinal section having an axial bore with an open end; (d) an elongated handle member having one end press-fitting from the open end and secured within the axial bore of the longitudinal section of the flexible insert member; and (e) the flexible connecting section having a pair of symmetrical arcuate recesses located on opposite sides and extending the width of the flexible connecting section, each arcuate recess forming an upper engagement pad and a lower stop limit pad, where the upper engagement pad and its respective lower stop limit form a predetermined gap distance for allowing lateral flexing of the longitudinal section and the handle member between the range of approximately 3°-75°; (f)

whereby the flexible insert member allows the handle member to maneuver the head member to be pushed back and forth while at the same time allows the handle member to move laterally relative to the head member and when the head member comes in contact with an object, either one of the upper engagement pads comes in contact with its respective aligned lower stop limit pad and thereby prevents the handle member from lateral movement such that the flexible insert member prevents the handle member from breaking-off from the head member.

[0045] Further defined more broadly, the present invention is a flexible insert member to be used in conjunction with a brush broom having a handle and a laterally disposed cleaning head with a top surface, a bottom surface and a plurality of bristles attached to the bottom surface and extending downwardly therefrom, the flexible insert member comprising: (a) a unitary flexible body having a mounting section, a longitudinal section and a flexible connecting section integrally connecting the head section with the longitudinal section, the longitudinal section having an axial bore with an open end for receiving and securing one end of the handle thereto; (b) the flexible connecting section having a pair of symmetrical arcuate recesses located on opposite sides and extending the width of the flexible connecting section, each arcuate recess forming an upper engagement pad and a lower stop limit pad, where the upper engagement and its respective lower stop limit form a predetermined gap distance for allowing a predetermined angle of lateral flexing of the longitudinal section and the handle; and (c) means for centrally attaching the mounting section to the top surface of the head of the brush broom such that the longitudinal section extends upwardly and outwardly to form an angle relative to the mounting section; (d) whereby the flexible insert member allows the handle to maneuver the head of the brush broom to be pushed back and forth while at the same time allows the handle to move laterally relative to the head and when the head comes in contact with an object, either one of the upper engagement pads comes in contact with its respective aligned lower stop limit pad and thereby prevents the handle from lateral movement such that the flexible insert member prevents the handle from breaking-off from the cleaning head.

[0046] Further defined even more broadly, the present invention is an attachment member to be used in conjunction with a cleaning apparatus having a handle and a laterally disposed cleaning head, the attachment member comprising: (a) a body made of elastomer material and having a mounting section, a longitudinal section and a flexible connecting section connecting the mounting section with the longitudinal section, the longitudinal section for receiving and securing one end of the handle thereto; (b) the flexible connecting section having a thickness which is thinner than the thickness of the mounting section and the longitudinal section for allowing a predetermined angle of lateral flexing of the

flexible connecting section with the longitudinal section; and (c) means for attaching the mounting section to the cleaning head of the cleaning apparatus such that the longitudinal section extends upwardly and outwardly to form an angle relative to the mounting section; (d) whereby the attachment member allows the handle to maneuver the cleaning head of the cleaning apparatus to be pushed back and forth while at the same time allows the handle to move laterally relative to the cleaning head.

[0047] Of course the present invention is not intended to be restricted to any particular form or arrangement, or any specific embodiment, or any specific use, disclosed herein, since the same may be modified in various particulars or relations without departing from the spirit or scope of the claimed invention hereinabove shown and described of which the apparatus or method shown is intended only for illustration and disclosure of an operative embodiment and not to show all of the various forms or modifications in which this invention might be embodied or operated.

[0048] The present invention has been described in considerable detail in order to comply with the patent laws by providing full public disclosure of at least one of its forms. However, such detailed description is not intended in any way to limit the broad features or principles of the present invention, or the scope of the patent to be granted. Therefore, the invention is to be limited only by the scope of the appended claims.

Claims

1. A push broom, comprising:

- a. an elongated laterally disposed broom head having a top surface and a bottom cleaning surface, the bottom cleaning surface having a plurality of bristles extending downwardly therefrom;
- b. a unitary flexible attachment mechanism having a mounting section, an inclined longitudinal section, and a flexible connecting section integrally connecting the mounting section and the longitudinal section together, the mounting section centrally affixed to said top surface of said broom head such that the longitudinal section extends upwardly and outwardly to form an angle relative to the mounting section, the longitudinal section having an axial bore with an open end;
- c. an elongated broom handle having one end press-fitting from said open end and secured within said axial bore of said longitudinal section of said flexible attachment mechanism;
- d. said flexible connecting section having a pair of recesses located on opposite sides and extending the width of said flexible connecting

section, each recess forming an upper engagement pad and a lower stop limit pad, where the upper engagement pad and its respective lower stop limit pad form a predetermined gap for allowing lateral flexing of said longitudinal section and said broom handle; and

e. a downward stop limit member integrally molded with said attachment mechanism and extending downwardly from said connecting section and engageable with a rear end of said broom head, where the downward stop limit member controls the amount of downward flexing of said connecting and longitudinal sections in the downward direction;

f. whereby said attachment mechanism is pre-loaded when a user pushes down on said broom handle causing said connecting and longitudinal sections to flex downward and upon releasing the downward pressure during a normal sweeping action, the pre-loaded flexible attachment mechanism springs up said broom head causing the debris in front of said broom head to be lifted up and pushed further away from said broom head.

2. The push broom in accordance with Claim 1, wherein said flexible attachment mechanism is made out of elastomeric material.

3. An attachment member to be used in conjunction with a push broom having a handle member and a laterally disposed cleaning head member with a top surface, a bottom surface and a plurality of bristles attached to the bottom surface and extending downwardly therefrom, the attachment member comprising:

- a. a unitary flexible body having a mounting section, a longitudinal section and a flexible connecting section integrally connecting the mounting section and the longitudinal section together, the longitudinal section having an axial bore with an open end for receiving and securing one end of said handle member thereto;
- b. said flexible connecting section having a pair of through recesses located on opposite sides and extending the width of said flexible connecting section, each recess forming an upper engagement pad and a lower stop limit pad, where the upper engagement pad and its respective lower stop limit pad form a predetermined gap for allowing a predetermined angle of lateral flexing of said longitudinal section and said handle;
- c. means for attaching said mounting section to said top surface of said head member of said push broom; and
- d. a downward stop limit member integrally

formed with said unitary flexible body and extending downwardly from said connecting section for engaging with said head member, where the downward stop limit member controls the amount of downward flexing of said connecting and longitudinal sections in the downward direction;

e. whereby said unitary flexible body of said attachment member is pre-loaded when a user pushes down on said handle member causing said connecting and longitudinal sections to flex downward and upon releasing the downward pressure during a normal sweeping action, the pre-loaded flexible body of said attachment member springs up said head member causing the debris in front of said head member to be lifted up and pushed further away from said head member.

4. An attachment member to be used in conjunction with a cleaning apparatus having a cleaning head and a handle, the attachment member comprising:

a. a flexible body having a mounting section for mounting to said cleaning head, a longitudinal section for receiving and securing one end of said handle thereto, and a connecting section interconnecting the mounting section and the longitudinal section together;

b. said connecting section having a thickness which is thinner than the thickness of said mounting section and said longitudinal section for allowing a predetermined angle of lateral flexing of said connecting section with said longitudinal section;

c. means for attaching said mounting section to said cleaning head of said cleaning apparatus; and

d. means for limiting the downward flexing of said connecting section and said longitudinal section, where the limiting means controls the amount of downward flexing;

e. whereby said body of said attachment member is pre-loaded when a user pushes down on said handle causing said connecting and longitudinal sections to flex downward and upon releasing the downward pressure during a normal sweeping action, the pre-loaded body of said attachment member springs up said cleaning head causing the debris in front of said cleaning head to be lifted up and pushed further away from said cleaning head.

5. An attachment member to be used in conjunction with a cleaning apparatus having a cleaning head and a handle, the attachment member comprising:

a. a flexible body having a mounting section for

mounting to said cleaning head, a longitudinal section for receiving and securing one end of said handle thereto, and a connecting section interconnecting the mounting section and the longitudinal section together;

b means for attaching said mounting section to said cleaning head of said cleaning apparatus; and

c. means for limiting the downward flexing of said connecting section and said longitudinal section, where the limiting means controls the amount of downward flexing;

d. whereby said body of said attachment member is pre-loaded when a user pushes down on said handle causing said connecting and longitudinal sections to flex downward and upon releasing the downward pressure during a normal sweeping action, the pre-loaded body of said attachment member springs up said cleaning head causing the debris in front of said cleaning head to be lifted up and pushed further away from said cleaning head.

6. A brush broom, comprising:

a. an elongated laterally disposed head member having a top surface and a bottom surface;

b. a plurality of bristles each having one end affixed to said bottom surface of said head member and extending downwardly therefrom;

c. a unitary flexible insert member having a mounting section, an inclined longitudinal section and a flexible connecting section integrally connecting the mounting section with the longitudinal section, the mounting section centrally affixed to said top surface of said head member such that the longitudinal section extends upwardly and outwardly to form an angle relative to the mounting section, the longitudinal section having an axial bore with an open end;

d. an elongated handle member having one end press-fitting from said open end and secured within said axial bore of said longitudinal section of said flexible insert member; and

e. said flexible connecting section having a pair of symmetrical arcuate recesses located on opposite sides and extending the width of said flexible connecting section, each arcuate recess forming an upper engagement pad and a lower stop limit pad, where the upper engagement pad and its respective lower stop limit form a predetermined gap distance for allowing lateral flexing of said longitudinal section and said handle member between the range of approximately 3°-75°;

f. whereby said flexible insert member allows said handle member to maneuver said head member to be pushed back and forth while at

the same time allows said handle member to move laterally relative to said head member and when said head member comes in contact with an object, either one of said upper engagement pads comes in contact with its respective aligned lower stop limit pad and thereby prevents said handle member from lateral movement such that said flexible insert member prevents said handle member from breaking-off from said head member.

7. The brush broom in accordance with Claim 6, wherein said flexible insert member is made out of elastomer material.

8. A flexible insert member to be used in conjunction with a brush broom having a handle and a laterally disposed cleaning head with a top surface, a bottom surface and a plurality of bristles attached to the bottom surface and extending downwardly therefrom, the flexible insert member comprising:

a. a unitary flexible body having a mounting section, a longitudinal section and a flexible connecting section integrally connecting the head section with the longitudinal section, the longitudinal section having an axial bore with an open end for receiving and securing one end of said handle thereto;

b. said flexible connecting section having a pair of symmetrical arcuate recesses located on opposite sides and extending the width of said flexible connecting section, each arcuate recess forming an upper engagement pad and a lower stop limit pad, where the upper engagement and its respective lower stop limit form a predetermined gap distance for allowing a predetermined angle of lateral flexing of said longitudinal section and said handle; and

c. means for centrally attaching said mounting section to said top surface of said head of said brush broom such that said longitudinal section extends upwardly and outwardly to form an angle relative to said mounting section;

d. whereby said flexible insert member allows said handle to maneuver said head of said brush broom to be pushed back and forth while at the same time allows said handle to move laterally relative to said head and when said head comes in contact with an object, either one of said upper engagement pads comes in contact with its respective aligned lower stop limit pad and thereby prevents said handle from lateral movement such that said flexible insert member prevents said handle from breaking-off from said cleaning head.

9. The flexible insert member in accordance with

Claim 8, wherein said flexible body is made out of elastomer material.

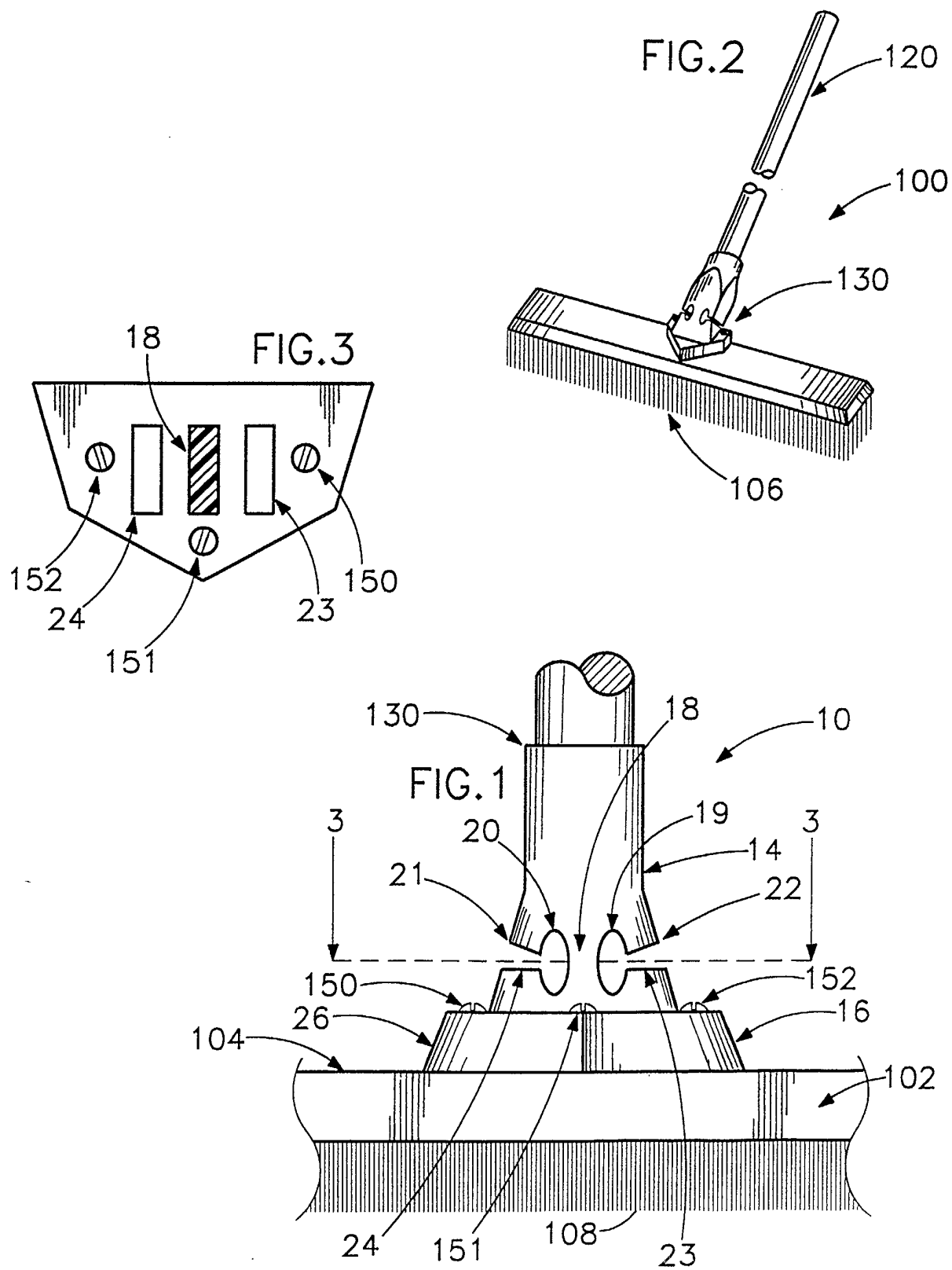
10. An attachment member to be used in conjunction with a cleaning apparatus having a handle and a laterally disposed cleaning head, the attachment member comprising:

a. a body made of elastomer material and having a mounting section, a longitudinal section and a flexible connecting section connecting the mounting section with the longitudinal section, the longitudinal section for receiving and securing one end of said handle thereto;

b. said flexible connecting section having a thickness which is thinner than the thickness of said mounting section and said longitudinal section for allowing a predetermined angle of lateral flexing of said flexible connecting section with said longitudinal section; and

c. means for attaching said mounting section to said cleaning head of said cleaning apparatus such that said longitudinal section extends upwardly and outwardly to form an angle relative to said mounting section;

d. whereby said attachment member allows said handle to maneuver said cleaning head of said cleaning apparatus to be pushed back and forth while at the same time allows said handle to move laterally relative to said cleaning head.



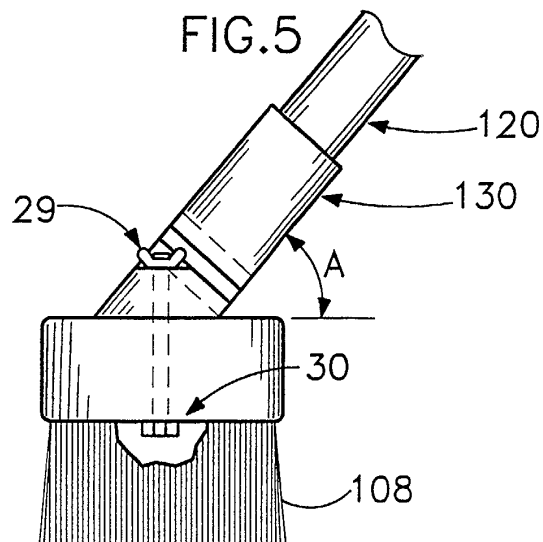
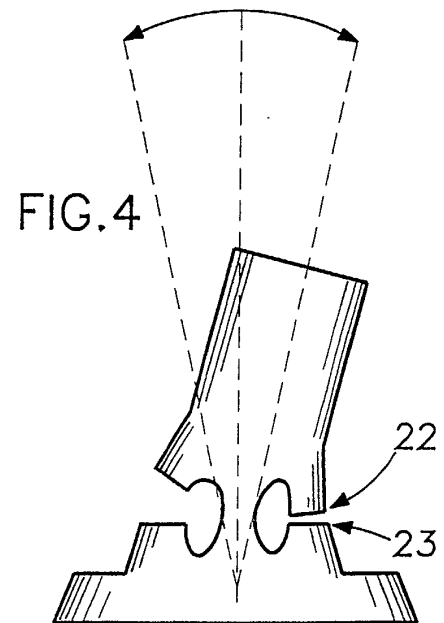
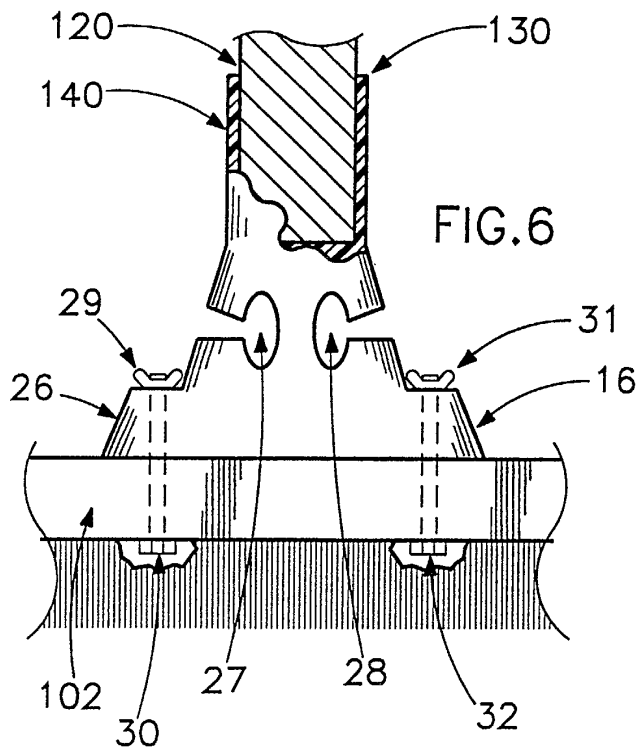


FIG.7

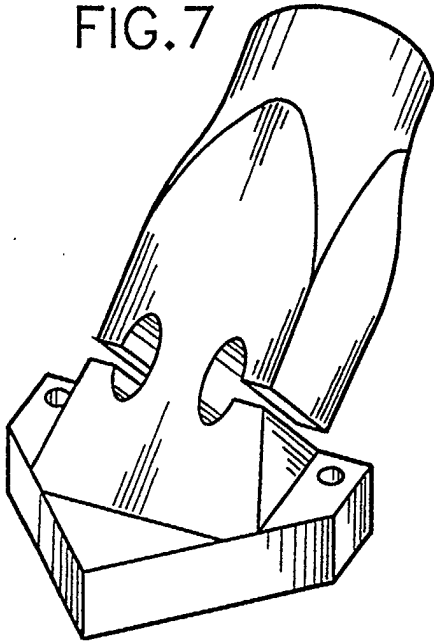


FIG.8

