

Description

The present invention relates to a new masking member used to protect the inside and circumference of a hole such as a water outlet hole, a cable piercing hole, and the like from a surface treatment such as coating, plating, phosphatizing, vacuum evaporation and the like.

More particularly, the present invention relates to a new masking member consisting of an inserting part and a flange formed at the base of the inserting part wherein the inserting part has a shape which partially contacts the inner wall of a hole into which the inserting part is inserted.

In a case where the surface treatment is effected on the surface of an article, the surface of the article often has one or more hole(s) whose inside must be protected from the surface treatment. The hole(s) may be a water outlet hole, a cable piercing hole, and the like, and a grommet, a plug, a bolt and the like may be inserted into the hole(s).

Hitherto, a masking member of the plug type has been used to protect such a hole from a surface treatment. The masking member may be inserted into a hole of an article to be protected before the surface treatment and, when the surface treatment is effected on the surface of an article, the hole of the masking member is not subjected to the surface treatment. After the surface treatment, the masking member may be removed from the hole of the article. Nevertheless, when the masking member is inserted into the hole, the whole circumference of the inserting part of the masking member may come into contact with the inner wall of the hole and therefore the friction between the masking member and the hole may be very large. As a result, the large friction may obstruct the smooth removing of the masking member from the hole.

Further, as the masking member will be useless and abandoned after the masking member is removed from the hole, it may be necessary to save or reduce the material cost of the masking member.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to resolve trouble when the masking member is removed from the hole(s) of an article, the inside of which requires to be protected from a surface treatment. A further object of the present invention is to save the material cost of the masking member.

According to the present invention, there is provided a masking member for use in protecting the inside and circumference of a hole in an article while the article receives surface treatment, the

masking member being of plastics or rubber material and having two parts, namely an inserting part which, in use, extends into the hole to hold the masking member to the article, and a flange which extends outwardly beyond the inserting part and is to contact the article around the hole and protect the circumference of the hole during surface treatment, characterised in that the inserting part is shaped so that, when inserted in the hole, it resiliently contacts the interior of the hole at a plurality of points spaced apart around the inner periphery of the hole in order to retain the masking member in position.

The invention also provides a corresponding method.

Optional features of the invention are defined in the sub-claims hereto. When the masking member is used, the masking member is inserted into the hole which it is to be masked and, as a result, the inside of the hole is protected from the surface treatment. After the surface treatment, the masking member is removed from the hole without obstruction of friction between the masking member and the hole since the circumference of the inserting part of the masking member may only come into contact partially with the inner wall of the hole.

The masking member may be made of plastics such as polystyrene, polyethylene, polypropylene and the like, or rubber such as styrene-butadiene rubber, acrylonitrile-butadiene rubber and the like, or a foam of such plastics or such rubber, and the masking member may be coloured by (a) suitable colour(s) if desired, for the purpose of selection of the specified masking member according to the hole to be inserted. A masking member made of polystyrene foam may be one of the most suitable masking members of the present invention.

The invention will be further described by way of example with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the first embodiment of the present invention;

Figure 2 is a partial side sectional view of the article including a hole after the surface treatment;

Figure 3 is a partial plan view to illustrate the elastic deformation of the inserting part of the masking member;

Figure 4 is a partial perspective view of the article including the hole after the removal of the masking member;

Figure 5 is a partial side sectional view of the article including the hole into which a grommet has been inserted;

Figure 6 is a perspective view of a second embodiment;

Figure 7 is a perspective view of a third embodiment;

Figure 8 is a perspective view of a fourth embodiment; and

Figure 9 is a perspective view of a fifth embodiment.

Figure 1 to Figure 5 relate to the first embodiment of the present invention. Referring now to Figure 1, a masking member (100) consists of an inserting part (110) at one end and a circular flange (120) formed at the base of the inserting part (110). The inserting part (110) is cross-shaped and only partially contacts the inner wall of a hole at the tips (111) of the cross-shape to save material costs of the masking member (100).

When the masking member (100) is used, the masking member (100) protects the inside of the hole (210) of an article (200) by inserting the inserting part (110) into the hole (210) as shown in Figure 2, and the flange (120) of the masking member (100) covers the surroundings (220) of the hole (210), wherein only the partially contacting parts (111) of the inserting part (110) come into contact with the inner wall (211) of the hole (210).

It may be desirable that the diameter of the cross-shaped inserting part (110) is a little larger than the diameter of the hole (210) and in this case, the tips (111) of the cross-shaped inserting part (110) may be elastically deformed by the pressure of the inner wall (211) of the hole (210) as shown by the dotted line in Figure 3. Thus, the masking member (100) is elastically fixed into the hole (210). After which, a surface treatment such as a coating is effected on the surface of the article (200) to form a film (300) of the surface treatment and the inside and the surroundings of the hole (210) are not subjected to the surface treatment. After the surface treatment, the masking member may be removed from the hole (210) by hand, hook, and the like. Where the masking member (100) is made of a thermoplastic foam, the masking member (100) can be removed from the hole (210) by heating at a temperature higher than the softening point of the thermoplastic foam. When the masking member (100) made of the thermoplastic foam is heated to a temperature higher than the softening point of the thermoplastic foam of the masking member it may be softened and gases such as air, gas of a blowing agent, and the like in the cells of the thermoplastic foam may first expand and so the masking member may also expand and, then, when the gases leave the cells, the masking member (100) may shrink rapidly and remove itself naturally from the hole (21). As before mentioned, the inserting part (110) of the masking member (100) contacts partially with the inner wall (211) of the hole (210), so the masking member (100) may be smoothly removed without the obstruction of the friction between the inserting part (110) and the inner wall (211) of the hole (210).

After the masking member (100) is removed from the hole (210), the film (300) has not been formed inside and on the surroundings (220) of the hole (210) as shown in Figure 4 and a grommet (400) may be tightly inserted into the hole (210) as shown in Figure 5.

Figure 6 shows a second embodiment. In this embodiment, a masking member (100A) consists of an inserting part (110A) and a flange (120A) formed at the base of the inserting part (110A). The inserting part (110A) is triangular-shaped and has a hole (112A) in its centre, the material cost of the masking member (100A) may be saved by the unused material space around the triangular shape and the area used for the hole (112A).

When the masking member (100A) is inserted into a hole, only the apexes (111A) of the triangular inserting part (110A) come into contact with the inner wall of the hole, and in a case where the diameter of the triangular inserting part (110A) is a little larger than the diameter of the hole, the apexes of the triangular inserting part (110A) may be elastically deformed by the pressure of the inner wall of the hole and, as a result, the masking member (100A) is elastically fixed into the hole.

Figure 7 shows a third embodiment. In this embodiment, a masking member (100B) consists of an inserting part (110B) and a flange (120B) formed at the base of the inserting part (110B). The inserting part (110B) is square-shaped and has a hole (112B) in its centre, the material cost of the masking member (100B) may be saved by the unused material space around the square shape and the area of the hole (112B). When the masking member (100B) is inserted into a hole, only the corners (111B) of the square inserting part (110B) come into contact with the inner wall of the hole.

Figure 8 shows a fourth embodiment. In this embodiment, a masking member (100C) consists of an inserting part (110C) and a flange (120C) formed at the base of the inserting part (110C). The inserting part (110C) is of a three forked shape and the material cost of the masking member (100C) may be saved by the unused material space around the three forked shape. When the masking member (100C) is inserted into a hole, only the tips (111C) of the three forked inserting part (110C) come into contact with the inner wall of the hole.

Figure 9 shows a fifth embodiment. In this embodiment, a masking member (100D) consists of an inserting part (110D) and a flange (120D) formed at the base of the inserting part (110D). The inserting part (110D) consists of four columns (111D) and the material cost of the masking member (100D) is reduced by the unused material space around the four columns (111D). When the masking member (100D) is inserted into a hole, only the four columns (111D) of the inserting part

(110D) come into contact with the inner wall of the hole.

Various other shapes and configurations of the inserting part are possible within the scope of the appended claims.

Claims

1. A masking member for use in protecting the inside and circumference of a hole in an article while the article receives surface treatment, the masking member being of plastics or rubber material and having two parts, namely an inserting part (110) which, in use, extends into the hole to hold the masking member to the article, and a flange (120) which extends outwardly beyond the inserting part (110) and is to contact the article around the hole and protect the circumference of the hole during surface treatment, characterised in that the inserting part (110) is shaped so that, when inserted in the hole, it resiliently contacts the interior of the hole at a plurality of points spaced apart around the inner periphery of the hole in order to retain the masking member in position.
2. A masking member according to claim 1 or 2, wherein the periphery of the inserting part (110) is polygonal.
3. A masking member according to claim 2, wherein the inserting part (110) is triangular.
4. A masking member according to claim 2, wherein the inserting part (110) is square.
5. A masking member according to claim 2, 3 or 4, wherein the inserting part (110) is provided with a central hole or recess (112A/B) to facilitate deformation of the inserting part (110) on insertion in the hole.
6. A masking member according to claim 1, wherein the inserting part (110) is cross-shaped.
7. A masking member according to claim 1, wherein the inserting part (110) is three legged in shape.
8. A masking member according to claim 1, wherein the inserting part consists of four separate columns.
9. A masking member according to any one of the preceding claims coloured by (a) suitable colour(s).

10. A masking member according to any one of the preceding claims made of a thermoplastic foam.

11. A new masking member of claim 10, wherein the thermoplastic foam is a polystyrene foam.

12. A method of surface treatment of a workpiece including the step of inserting in at least one hole in the workpiece which is to be masked from surface treatment a masking member prior to the surface treatment step and removing the at least one masking member after the surface treatment step, the masking member being of plastics or rubber material and having two parts namely an inserting part (110) which, in use, extends into the hole to hold the masking member to the article, and a flange (120) which extends outwardly beyond the inserting part (110) and is to contact the article around the hole and protect the circumference of the hole during surface treatment, characterised in that the inserting part (110) is shaped so that, when inserted in the hole, it resiliently contacts the interior of the hole at a plurality of points spaced apart around the inner periphery of the hole in order to retain the masking member in position.

Revendications

1. Élément de masquage pour l'utilisation à la protection de l'intérieur et de la circonférence d'un trou dans un article lorsque l'article reçoit un traitement de surface, l'élément de masquage étant en matière plastique ou en matériau caoutchouteux, et ayant deux parties, à savoir une partie d'insertion (110), qui, lors de l'utilisation, s'étend dans le trou de façon à maintenir l'élément de masquage sur l'article, et un flasque (120) qui s'étend vers l'extérieur au-delà de la partie d'insertion (110) et qui vient en contact avec l'article autour du trou et qui protège la circonférence du trou durant le traitement de surface, caractérisé en ce que la partie d'insertion (110) a une forme telle que, lorsqu'elle est insérée dans le trou, elle vienne en contact de façon élastique avec l'intérieur du trou en une pluralité de points espacés les uns des autres autour de la périphérie intérieure du trou de façon à maintenir l'élément de masquage en place.
2. Élément de masquage selon la revendication 1, dans lequel la périphérie de la partie d'insertion (110) est polygonale.
3. Élément de masquage selon la revendication



(110D) come into contact with the inner wall of the hole.

Various other shapes and configurations of the inserting part are possible within the scope of the appended claims.

Claims

1. A masking member for use in protecting the inside and circumference of a hole in an article while the article receives surface treatment, the masking member being of plastics or rubber material and having two parts, namely an inserting part (110) which, in use, extends into the hole to hold the masking member to the article, and a flange (120) which extends outwardly beyond the inserting part (110) and is to contact the article around the hole and protect the circumference of the hole during surface treatment, characterised in that the inserting part (110) is shaped so that, when inserted in the hole, it resiliently contacts the interior of the hole at a plurality of points spaced apart around the inner periphery of the hole in order to retain the masking member in position.
2. A masking member according to claim 1 or 2, wherein the periphery of the inserting part (110) is polygonal.
3. A masking member according to claim 2, wherein the inserting part (110) is triangular.
4. A masking member according to claim 2, wherein the inserting part (110) is square.
5. A masking member according to claim 2, 3 or 4, wherein the inserting part (110) is provided with a central hole or recess (112A/B) to facilitate deformation of the inserting part (110) on insertion in the hole.
6. A masking member according to claim 1, wherein the inserting part (110) is cross-shaped.
7. A masking member according to claim 1, wherein the inserting part (110) is three legged in shape.
8. A masking member according to claim 1, wherein the inserting part consists of four separate columns.
9. A masking member according to any one of the preceding claims coloured by (a) suitable colour(s).

10. A masking member according to any one of the preceding claims made of a thermoplastic foam.

11. A new masking member of claim 10, wherein the thermoplastic foam is a polystyrene foam.

12. A method of surface treatment of a workpiece including the step of inserting in at least one hole in the workpiece which is to be masked from surface treatment a masking member prior to the surface treatment step and removing the at least one masking member after the surface treatment step, the masking member being of plastics or rubber material and having two parts namely an inserting part (110) which, in use, extends into the hole to hold the masking member to the article, and a flange (120) which extends outwardly beyond the inserting part (110) and is to contact the article around the hole and protect the circumference of the hole during surface treatment, characterised in that the inserting part (110) is shaped so that, when inserted in the hole, it resiliently contacts the interior of the hole at a plurality of points spaced apart around the inner periphery of the hole in order to retain the masking member in position.

Revendications

1. Élément de masquage pour l'utilisation à la protection de l'intérieur et de la circonférence d'un trou dans un article lorsque l'article reçoit un traitement de surface, l'élément de masquage étant en matière plastique ou en matériau caoutchouteux, et ayant deux parties, à savoir une partie d'insertion (110), qui, lors de l'utilisation, s'étend dans le trou de façon à maintenir l'élément de masquage sur l'article, et un flasque (120) qui s'étend vers l'extérieur au-delà de la partie d'insertion (110) et qui vient en contact avec l'article autour du trou et qui protège la circonférence du trou durant le traitement de surface, caractérisé en ce que la partie d'insertion (110) a une forme telle que, lorsqu'elle est insérée dans le trou, elle vienne en contact de façon élastique avec l'intérieur du trou en une pluralité de points espacés les uns des autres autour de la périphérie intérieure du trou de façon à maintenir l'élément de masquage en place.

2. Élément de masquage selon la revendication 1, dans lequel la périphérie de la partie d'insertion (110) est polygonale.

3. Élément de masquage selon la revendication

- 2, dans lequel la partie d'insertion (110) est triangulaire.
4. Élément de masquage selon la revendication 2, dans lequel la partie d'insertion (110) est carrée. 5
5. Élément de masquage selon la revendication 2, 3 ou 4, dans lequel la partie d'insertion (110) est munie d'un trou ou cavité central (112A/B) afin de faciliter la déformation de la partie d'insertion (110) lors de l'insertion dans le trou. 10
6. Élément de masquage selon la revendication 1, dans lequel la partie d'insertion (110) a la forme d'une croix. 15
7. Élément de masquage selon la revendication 1, dans lequel la partie d'insertion (110) a une forme à trois pattes. 20
8. Élément de masquage selon la revendication 1, dans lequel la partie d'insertion se compose de quatre colonnes séparées. 25
9. Élément de masquage selon l'une quelconque des revendications précédentes, coloré par une ou plusieurs couleurs appropriées.
10. Élément de masquage selon l'une quelconque des revendications précédentes, fait en une mousse thermoplastique. 30
11. Nouvel élément de masquage selon la revendication 10, dans lequel la mousse thermoplastique est une mousse de polystyrène. 35
12. Procédé de traitement de surface d'une pièce de travail comprenant l'étape d'insertion dans au moins un trou de la pièce de travail, qui doit être masqué pour le traitement de surface, d'un élément de masquage avant l'étape de traitement de surface, et de retrait de cet élément de masquage au moins, après l'étape de traitement de surface, l'élément de masquage étant en matière plastique ou en matière caoutchouteuse, et ayant deux parties, à savoir une partie d'insertion (110), qui, lors de l'utilisation, s'étend à l'intérieur du trou de façon à maintenir l'élément de masquage sur l'article, et un flasque (120) qui s'étend vers l'extérieur au-delà de la partie d'insertion (110) et qui vient en contact avec l'article autour du trou et qui protège la circonférence du trou durant le traitement de surface, caractérisé en ce que la partie d'insertion (110) a une forme telle que, lorsqu'elle est insérée dans le trou, elle vienne en contact de façon élastique avec 40 45 50 55

l'intérieur du trou en une pluralité de points espacés les uns des autres autour de la périphérie intérieure du trou afin de maintenir l'élément de masquage en place.

Patentansprüche

1. Maske zum Schutz der Innenseite und des Umfangs einer Bohrung in einem Gegenstand, der oberflächenbehandelt wird, wobei die Maske aus Kunststoff oder Gummimaterial besteht und zwei Teile aufweist, nämlich einem Einsatzteil (110), der sich im Gebrauch in die Bohrung erstreckt, um die Maske am Gegenstand festzuhalten, und einen Flansch (120), der sich nach außen über den Einsatzteil (110) hinaus erstreckt und den Gegenstand um die Bohrung herum berührt und den Umfang der Bohrung während der Oberflächenbehandlung schützt, dadurch gekennzeichnet, daß das Einsatzteil (110) derart geformt ist, daß er beim Einsatz in der Bohrung das Innere der Bohrung an mehreren Stellen elastisch berührt, die am Innenumfang der Bohrung im Abstand zueinander liegen, um die Maske positioniert festzuhalten.
2. Maske nach Anspruch 1 oder 2, wobei der Umfang des Einsatzteils (110) polygonal ist.
3. Maske nach Anspruch 2, wobei das Einsatzteil (110) dreieckig ist.
4. Maske nach Anspruch 2, wobei das Einsatzteil (110) quadratisch ist.
5. Maske nach Anspruch 2, 3 oder 4, wobei das Einsatzteil (110) mit einer Mittelbohrung oder einer Aussparung (112A/B) versehen ist, um eine Verformung des Einsatzteils (110) beim Einsetzen in die Bohrung zu erleichtern.
6. Maske nach Anspruch 1, wobei das Einsatzteil (110) kreuzförmig ist.
7. Maske nach Anspruch 1, wobei das Einsatzteil (110) die Form eines Dreifußes hat.
8. Maske nach Anspruch 1, wobei das Einsatzteil aus vier getrennten Säulen besteht.
9. Maske nach einem der vorstehenden Ansprüche, die in (einer) geeigneten Farbe(n) eingefärbt ist.
10. Maske nach einem der vorstehenden Ansprüche, die aus einem thermoplastischen Schaum hergestellt ist.



11. Maske nach Anspruch 10, wobei der thermoplastische Schaum ein Polystyrol-Schaum ist.



12. Verfahren zur Oberflächenbehandlung eines Werkstücks mit den folgenden Verfahrensschritten: Einsetzen einer Maske vor der Oberflächenbehandlung in mindestens eine Bohrung in dem Werkstück, das zur Oberflächenbehandlung maskiert werden soll, und Entfernen der mindestens einen Maske nach der Oberflächenbehandlung, wobei die Maske aus Kunststoff oder Gummi besteht und zwei Teile aufweist, nämlich einen Einsetzteil (110), der sich bei Benutzung in die Bohrung erstreckt, um die Maske am Gegenstand festzuhalten, und einen Flansch (120), der sich nach außen über den Einsetzteil (110) hinaus erstreckt und in Berührung mit dem Gegenstand um der Bohrung steht und den Umfang der Bohrung während der Oberflächenbehandlung schützt, dadurch gekennzeichnet, daß das Einsetzteil (110) derart geformt ist, daß es nach dem Einsatz in der Bohrung das Innere der Bohrung an mehreren Stellen elastisch berührt, die um den Innenumfang der Bohrung im Abstand zueinander liegen, um die Maske positioniert festzuhalten.

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