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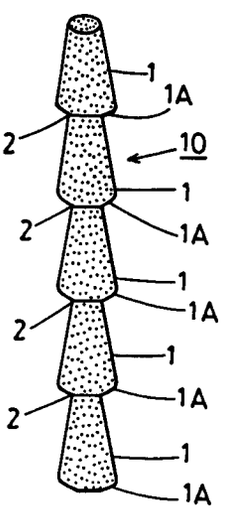
(54) **MASKING MATERIAL IN CONNECTED PIECES.**

(57) A masking material for protecting bored parts of a member from surface treatment or the like. It is composed of a plurality of plug-like pieces connected to each other in line through parts to be bent for picking off, in which the minimum diameter of a part to be picked off is set to 1/10 to 9/10 of the maximum diameter of said plug-like piece so that each piece can easily be bent and picked off at a correct position.

Fig. 1



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FIELD OF THE INVENTION

The present invention relates to a series of connected masking members of which each masking member is used to protect a hole from a surface treatment such as coating, plating, phosphatizing and the like.

For instance, a treatment that comprises the spraying of polyvinyl-chloride sol and the like and heating said polyvinyl-chloride sol to form a film of polyvinyl-chloride sol which is performed on the underside of a car. Nevertheless, said underside of a car has holes such as drain holes, bolt holes and the like and it may be necessary to avoid said polyvinyl-chloride sol entering into said holes.

DESCRIPTION OF THE PRIOR ART

Hitherto, to protect said holes from said surface treatment, a plug-type masking member (1) made of material such as a themoplastic foam has been used. Said plug-type masking member (1) is inserted in a hole (3) of an article (2) and then a surface treatment is performed to form a film (4) of said surface treatment as shown in Fig. 10 and after then said plug-type masking member (1) is removed by a hook or by heating to soften and contract said masking member (1) as shown in Fig. 11 (Tokkosho No. 48-29532).

Nevertheless, in said prior method, said plug-type masking members are reciprocally individual and the work to insert said plug-type masking member (1) into holes (3) requires much labor, since the worker must pick up each said plug-type masking member (1) one by one and said work requires much labor and may be troublesome especially in a mass-production continuation process such as the car-manufacturing process.

DISCLOSURE OF THE INVENTION

As a means to solve said prior problem, the present invention provides a series of connected masking members consisting of a plural number of plug-type unit of single masking members connected reciprocally wherein the connecting parts of said series of connected masking members are snap-off parts and said snap-off parts have a minimum diameter within said series of connected masking members and said minimum diameter is 1/10 to 9/10 of the maximum diameter of said series of connected masking members.

As materials for said series of connected masking members of the present invention, a thermoplastic resin such as polystyrene, polyethylene, polypropylene, polyvinyl chloride, polyamide and the like, a thermosetting resin such as melamine resin, urea resin, phenol resin, epoxy resin and the like, a filler mix containing plastic wherein a filler such as calcium carbonate, talc, bentonite, blast furnace slag, flyash, and the like is mixed in said thermoplastic resin or said thermosetting resin, a foamed plastic of said thermoplastic resin, said thermosetting resin, or said filler mix containing plastic, a fiber material wherein organic fiber, inorganic fiber, pulp and the like is bound by a synthetic resin binder, cork, wood, and the like may be used.

A preferable material for said series of conntected masking members of the present invention may be polystyrene foam. since said polystyrene foam is hard and brittle, and the snapping off of one of said connected masking members may be very easy.

Further, in a case where the density of said polystyrene foam is in the range between 14 to 500 g/l, the snapping off of each said connected masking members may be easier.

To produce said series of connected masking members, press, injection molding, cast molding, expansion molding, expansion injection molding may be applied.

Further, a sticking proof agent such as water-soluble polymer, DFK resin, synthetic resin paint, release agent, silicone, wax, and the like may be coated on the surface of said series of connected masking members to prevent the sticking of a melted masking member to the place where said masking member has been attached.

To protect holes by using said series of connected masking members, the first unit of such a series of masking members at the top is inserted into a hole to be protected by holding said series of connected masking members with a worker's hand, and said first unit of said series of masking members is separated at the top from the second unit of said series of masking members of said series of connected masking members by snapping off the snap-off part between said first unit of said masking members at the top and the second unit of said masking members. Thus, said first unit of said masking members at the top is attached in said hole and said second unit of said masking members is then situated at the top so that said second unit of said masking members at the top is inserted into another hole and separated by snapping it off from the second next unit of said masking members, the same as for said first unit of said masking members.

Accordingly, in the present invention, the labor to pick up each masking member one by one to insert said masking member into holes may be saved and each said unit of said masking members may be easily separated by snapping it off at the correct snapping position and said series of connected masking members may not be broken dur-

ing transportation, conveyance and handling so that workers can perform masking work very smoothly and the fatigue of such workers may be reduced and therefore, said series of connected masking members may be very suitable for the mass-production continuation process.

BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1 to 6 show an embodiment of the present invention and

Fig. 1 is a perspective view

Fig. 2 is a side view showing the sizes of the masking members Fig. 3 is a side sectional view when the first unit of the masking members is inserted into a hole

Fig. 4 is a side sectional view after a surface treatment

Fig. 5 is a side sectional view when said unit of the masking members is softened and contracted

Fig. 6 is a side sectional view when a bolt is attached in said hole

Fig. 7 is a perspective view of another embodiment

Fig. 8 is a perspective view of still another embodimentFig. 9 is a perspective view of still another embodimentFigs. 10 and 11 show the prior art

Fig. 10 is a side view showing a hole in which a masking member is inserted

Fig. 11 is a side view when said masking member is softened and contracted

In the DRAWINGS

(1), (11)
plug-type masking member
(2), (12), (22), (32)
connecting part
(10), (20), (30), (40)
series of connected masking members

DESCRIPTION OF THE INVENTION

Figs. 1 to 6 show an embodiment of the present invention. In Figs. 1 to 6, (1) is a plug-type unit masking member having a tapering cylinderical shape wherein the lower part of said unit of said masking member has a reverse tapering shape (1)-A and a plural number of said units of said masking member (1) (commonly 5 to 20 pieces of said units of said masking member (1) but the number of pieces depends on the size of said units of said masking member) are connected reciprocally and snap-off parts (2) are situated at the connecting part between each said unit of said masking member so that said plural number of units of said masking members are connected reciprocally to form a series of connected masking members (10). As shown in Fig. 2, in said series of connected masking members (10), the diameter d_1 of said snap-off part (2) is the minimum and supposing that the maximum diameter of one of said plug-type unit masking members (1) is d_2 and the relation between d_1 and d_2 may be $0.9 \geqq d_1/d_2 \geqq 0.1$.

To use said series of connected masking members (10) for masking, if desired, said series of connected masking members (10) may be snapped off in a suitable length to be easily held with a worker's hand, and for instance, the first plug-type unit of said masking member (1) at the top is inserted into a hole (4) of an article (3) to be protected and then said first unit of each said masking member (1) is separated by snapping it off between said first unit of said masking member (1) and said second unit of said masking member (1) as shown in Fig. 3. After said first unit of said masking member is attached in said hole (4) as above mentioned, a surface treatment is carried out on the surface of said article (3) to form a film (5) of said surface treatment as shown in Fig. 4, and in a case where said plug-type unit masking member (1) is made of a thermoplastic foam, said unit of said masking member (1) may be heated at a higher temperature than the softening point of said thermoplastic foam so as to be softened and at the same time the air and the gas of the blowing agent may come out of said softened masking member (1) so that said masking member (1) may contract as shown in Fig. 5 and in a case where said hole (4) is a bolt hole, when a bolt (6) is attached in said hole (4) as shown in Fig. 6, said contracting masking member (1) may be removed from said hole (4) together with said film (5) covering said hole (4).

In the present invention, as shown in Fig. 7, a series of connected masking members (20) in which a plural number of plug-type units of a masking member (11) having a ball shape are connected reciprocally with intermediating snap-off parts (12) may be provided and said plug-type units of said masking member have various shapes corresponding to the required shape of the hole insofar as the ratio of the diameter d_1 of said snap-off part and the maximum diameter d_2 is 0.1 to 0.9.

Further, as shown in Figs. 8 and 9, a series of connected masking members (30) and (40) wherein a plural number of plug-type units of each masking member (1) are connected reciprocally with intermediating snap-off parts (22), (32) having a pole shape may be provided in the present invention. In said series of connected masking members (30) and (40), said snap-off parts (22), (32) between

said plug-type units of each masking member may be more easily snapped off since said snap-off parts (22), (32) have a pole shape.

Claims

1. A series of connected masking members consisting of a plural number of plug-type units of a masking member connected reciprocally with intermediating snap-off parts wherein said snap-off parts have a minimum diameter and said minimum diameter is 1/10 to 9/10 of the maximum diameter of said plug-type unit of said masking member.

2. A series of connected masking members of Claim 1, where said plug-type unit of said masking member is made of a foamed plastic.

3. A series of connected masking members of Claim 1, where said foamed plastic is foamed polystyrene.

4. A series of connected masking members of Claim 1, where the density of said foamed polystyrene is 14 to 500 g/l.

Fig. 1

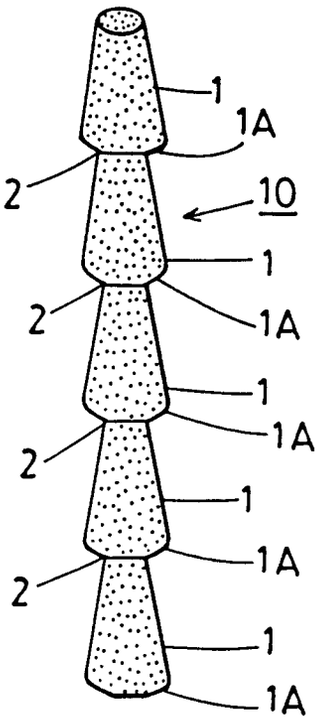


Fig. 2

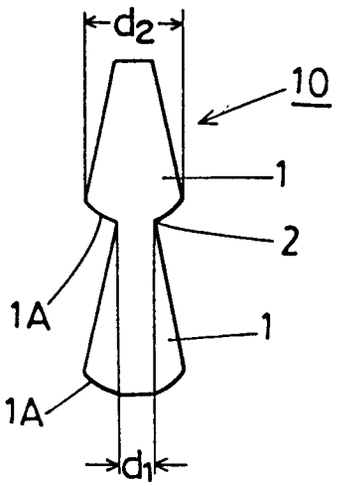


Fig. 3

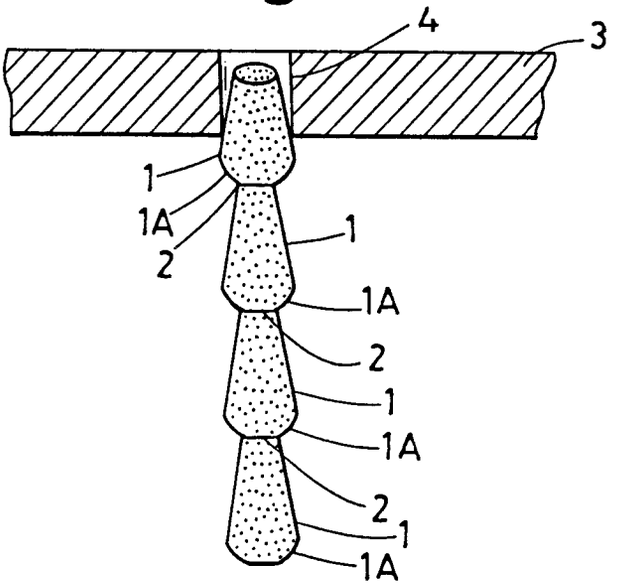


Fig. 4

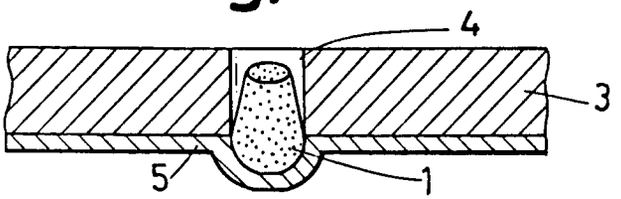


Fig. 5

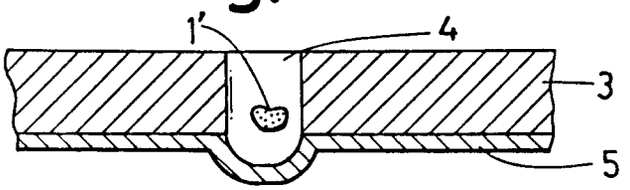


Fig. 6

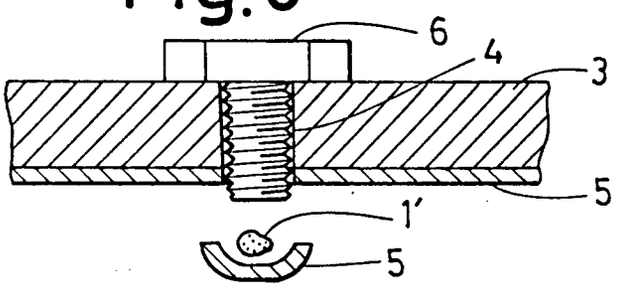


Fig. 7

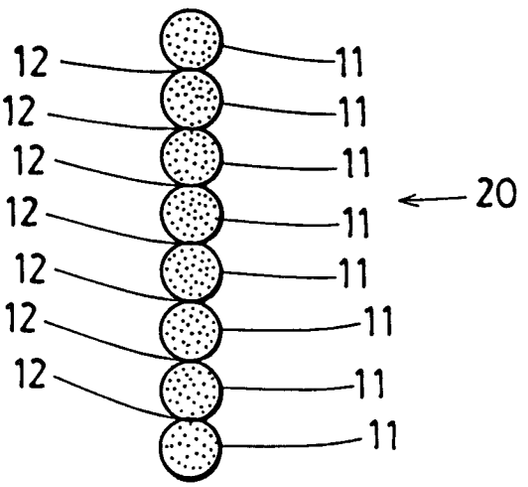


Fig. 8

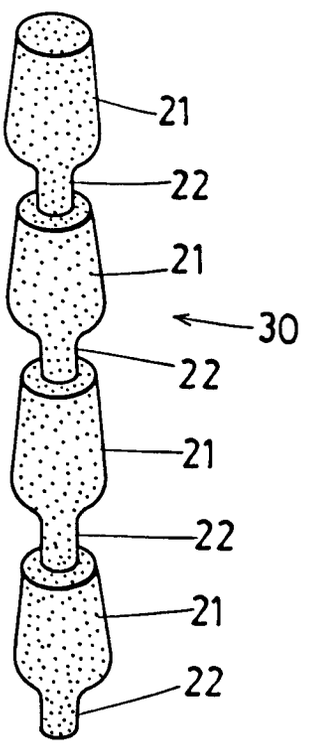


Fig. 9

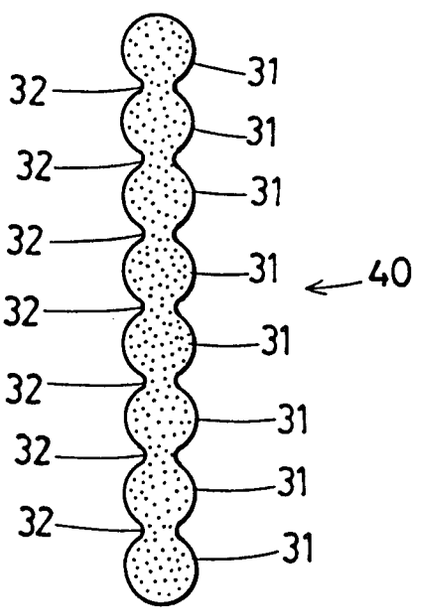


Fig. 10

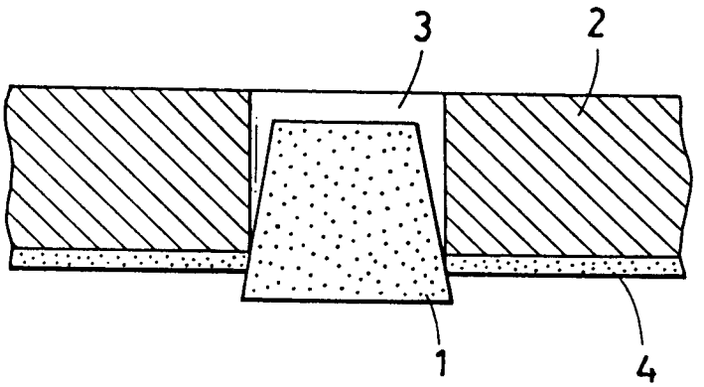
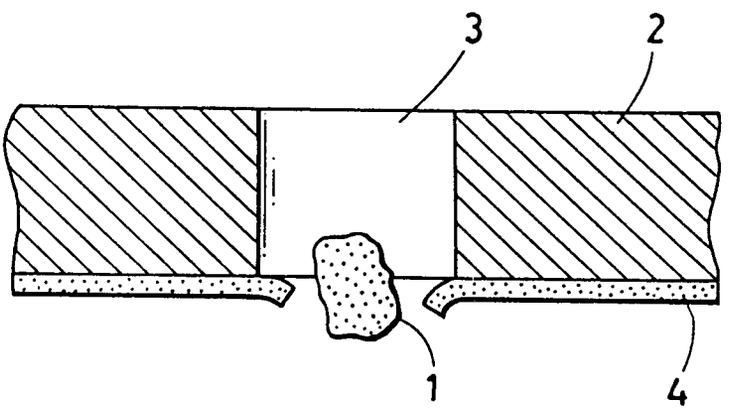


Fig. 11



INTERNATIONAL SEARCH REPORT

International Application No PCT/JP91/00468

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl[5] B05B15/04

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC	B05B15/04

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

Jitsuyo Shinan Koho 1926 - 1990
Kokai Jitsuyo Shinan Koho 1971 - 1990

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	JP, U, 63-201685 (Nagoya Yuka K.K. and another), December 26, 1988 (26. 12. 88), (Family: none)	1-4
X	JP, U, 1-148759 (Nagoya Yuka K.K.), October 16, 1989 (16. 10. 89), (Family: none)	1
X	JP, U, 1-148760 (Nagoya Yuka K.K.), October 16, 1989 (16. 10. 89), (Family: none)	1

* Special categories of cited documents: [10]

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
June 17, 1991 (17. 06. 91)	July 1, 1991 (01. 07. 91)
International Searching Authority	**Signature of Authorized Officer**
Japanese Patent Office	