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(54) Insert molding method and mold

Verfahren und Vorrichtung zum Spritzformen mit Einlegeteilen

Procédé et dispositif de moulage par injection avec des inserts

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Description

[0001] This invention concerns a molding method, in which molding of a synthetic resin or rubber is performed upon an insert (work piece) which is set beforehand inside a mold (this method is referred to hereinafter as "insert molding" or "insert molding method"), and a mold to be used in said insert molding method.

[0002] In an insert molding method, molding of a synthetic resin is performed upon a preexisting part, called an insert or a work piece, which is set beforehand inside a mold. Thus resin molded parts are formed on the upper surface or surroundings of the insert. This is widely used in the manufacture of various electronic parts, etc. Though insert molding is used with various resin molding methods, this invention is limited to the injection molding method.

[0003] The insert to be set beforehand inside the mold may be a worked resin molded part (of plate shape, rod shape, box shape, or other shape) or may be a part made from a non-resin material, such as metal, glass, ceramic or carbon.

[0004] In many cases, the insert is not manufactured with high dimensional precision. For example, when inserts having a range of thickness dimensions are set in molds to perform injection molding, depending on the insert, a gap may form at the surface of contact of a part of the insert and an upper mold even if clamping is performed. The resin that is injected into this part may flow out and become a burr.

[0005] The details of the above shall now be described with reference to drawings. As shown in Fig.3, when an insert 1, intended to have the shape of a flat plate, is low in working precision and has a thickness difference such that h1 < h2 and mold clamping is performed upon setting this insert on the upper face of a lower mold 2, the upper surface portion of insert 1 at the side of greater thickness (the h2 side) will contact the lower face of an upper mold 3 while a gap will form at the side of smaller thickness (the h1 side). Put in another way, since insert 1 is inclined, a gap will form at the peripheral lower face of a cavity (recessed part) 4 provided at the upper mold 3 side. Since cavity 4 is for defining a part that will be molded from synthetic resin, if injection of plastic via a gate 5 is performed in the condition where there is a gap at the lower face, a burr 7 will form at the lower end part of the resin molded product 6 as shown in Fig. 4.

[0006] In particular, with the injection molding method, since the resin is injected at high pressure, resin can leak out from even an extremely small gap and give rise to burrs. If a low injection pressure is set to prevent the formation of burrs, the precision and physical properties of the molded product will become poor.

[0007] Several modifications for preventing the above-described formation of burrs in insert molding have been tried and the results of such modifications have been disclosed for example in Japanese Patent Publication JP-A-8-288326.

[0008] Resolution of the problem of burr formation in insert molding is demanded since it leads not only to manufacturing loss but also to increased manufacturing cost resulting from the necessity for burr removal work.

[0009] The above mentioned Japanese Unexamined Patent Publication No. Hei-8-288326 teaches that by using a resilient member (a plurality of coiled springs) to support the lower face side of a supporting member on which an insert is set, the variation of the thickness of inserts can be absorbed to prevent the formation of burrs. (Similar arrangements are disclosed in JP-A-63274521 and JP-A-62236719.) However, since the dimensional variation of inserts is not fixed and there are various forms of variation, supporting by a plurality of springs that apply a uniform force on the insert supporting member does not provide a satisfactory solution.

[0010] Also as has been mentioned above, inserts are not limited to pressed metal inserts and synthetic resin inserts but also include ceramic, carbon, and glass inserts that can break readily at low impact force, and especially with the latter types of inserts, breakage of the insert set in the mold in the clamping process can occur and lead to manufacturing loss when there is variation of the outer shape.

[0011] This invention has been made in view of the above and an object thereof is to present an insert molding method and mold that are excellent in terms of prevention of insert breakage, prevention of burr formation, and manufacture, operation, maintenance, etc. of molds.

[0012] The insert molding method and the mold to be used in insert molding by this invention are characterized in having the following arrangements.

A. In an insert molding method, wherein an upper mold and a lower mold are disposed so as to oppose each other and the cavity at the upper mold side is filled by molten resin or rubber material that is injected via a gate to perform injection molding of the resin or rubber around an insert set at the lower mold side, an insert molding method characterized in that a movable supporting member, which supports the insert, is fitted in a recessed part formed on the upper face of the lower mold. The movable supporting member is supported tiltably on its lower face and pressed towards the upper mold side by the tip of a shaft of a pressing mechanism. There is a gap between the side face part of the recessed part and the side face part of the movable supporting member, to enable the movable supporting member to tilt about the point at which it is pressed and supported by the shaft inside the recessed part so that the upper face of the insert will be in uniform surface contact with the lower face of the upper mold. Desirably the shaft tip supports the movable supporting member at or adjacent a region beneath its centre of gravity.
B. In an insert molding mold, which is comprised of (a) an upper mold, (b) a lower mold, which is disposed so as to oppose the upper mold, (c) a recessed part, formed on the upper face of the lower mold, (d) a movable supporting member, which is fitted into the recessed part, there being (e) an insert setting part for location of an insert provided on the upper face of the movable supporting member, (f) a cavity, provided on the mold surface at the lower face of the above mentioned upper mold that opposes the above mentioned insert, and (g) a gate, provided at the upper mold for injection of molten resin or rubber material into the cavity, and is arranged for performing injection molding of resin or rubber material around the insert set on the upper face of the above mentioned movable supporting member by filling of the above mentioned cavity of the upper mold by injection of the molten resin or rubber material via the gate, an insert molding mold characterized in having (h) a pressing mechanism, which has a shaft that tiltably supports and presses the position of the center of gravity of the lower face of the above mentioned supporting member towards the upper mold, and in that (i) a gap is formed between the side face part of the recessed part and the side face part of the movable supporting member so that the movable supporting member is enabled to tilt about the point of pressing and support by the shaft inside the recessed part so that the upper face of the insert will be in surface contact with the lower face of the upper mold.

C. An insert molding method or mold as set forth in A or B above, wherein the shape defined by the side face of the movable supporting member as viewed in plan is similar to the shape defined by the the side face of the insert as viewed in plan.

D. An insert molding method or mold as set forth in A, B or C above, wherein the gap between the side face part of the above mentioned recessed part and the side face part of the movable supporting member is large at the side close to the upper mold and small at the side away from the upper mold.

E. An insert molding method or mold as set forth above, wherein the gap between the side face part of the above mentioned recessed part and the side face part of the movable supporting member is arranged to be greatest at the position closest to the upper mold and to decrease gradually and become zero with the distance from the upper mold.

DETAILED DESCRIPTION OF THE INVENTION

[0013] An embodiment of this invention shall now be described based on the attached drawings. This embodiment is an example of the case where the upper mold is a fixed mold and the lower mold is a movable mold.

[0014] In the accompanying drawings:

Fig. 1 shows schematic sectional views of a mold embodying this invention.

Fig. 2 shows an enlarged sectional view of the mold embodying this invention.

Figs. 3 and 4 show an explanatory diagram of a prior art device.

[0015] Fig. 1 shows an insert molding mold embodying this invention, with sectional views A to F illustrating one cycle of injection molding. In this embodiment, a hydraulic ejector 40 is used as an example of a pressing mechanism.

[0016] Fig. 1A shows the mold open, with a lower mold 20 spaced below upper mold 10. A gate 11, which serves as the resin outflow path, and a cavity 12, which becomes the resin molding part, are provided by the upper mold 10. The lower mold 20 has a recessed part 21 and a movable supporting member (floating plate) 30 is disposed in it. The plan shape of the movable supporting member 30 may be any shape, such as rectangular, polygonal, circular, etc., and the plan shape of recessed part 21 corresponds. Also, the plan shape of the movable supporting member 30 is preferably similar to the plan shape of an insert 50.

[0017] The tip of the shaft 41 of hydraulic ejector 40 contacts the central part of the lower face of movable supporting member 30 (i.e. the center of gravity of supporting member 30; that is, the center of gravity at the bottom face of the movable supporting member when insert 50 is set). At this contacting part, a recessed part may be formed in correspondence to the shape of the tip of shaft 41. Also, the tip of shaft 41 and the central part (center of gravity) of the lower face of movable supporting member 30 may be arranged to be attracted to each other by magnetic force or static electricity or may be provided with a structure in which a positioning pin is interposed.

[0018] Obviously to serve as part of an injection molding mold, the mechanical structure of movable supporting member 30 is required to endure the injection pressure of molten resin or rubber.

[0019] Fig. 1B shows the condition where insert 50 has been set on the upper face of movable supporting member 30. The setting of insert 50 may be performed by automatic or manual operation.

[0020] As shown in Fig. 1C, after the setting of insert 50 has been completed, lower mold 20 is moved towards upper mold 10 and clamping is performed.

[0021] As shown in Fig. 1D, after completion of clamping, hydraulic ejector 40 is driven and shaft 41 is raised. When the tip of shaft 41 is raised further upon contacting the bottom part of movable supporting member 30, movable supporting member 30 rises, while being restricted by the side face of recessed part 21 of lower mold 20 and the upper face of insert 50 comes in contact with
the lower face of upper mold 10. Here, in the case where the ends of insert 50 differ in thickness, the movable supporting member 30, which is in point contact with the tip of shaft 41, tilts in the direction of canceling the thickness difference of insert 50. That is, movable supporting member 30 tilts so that the side at which the thickness of insert 50 is small will become higher and the formation of a gap at the surface of contact of the lower face of upper mold 10 with insert 50 is thereby prevented.

[0022] To describe the above action in further detail, referring also to Fig. 2, in the case where insert 50 has a thickness difference, when insert 50 moves towards upper mold 10, the side (h2), at which the thickness is large, contacts the upper mold first and as the pressing by shaft 41 is continued further, the position of contact of the top part of the above mentioned h2 serves as a fulcrum so that only the side (h1), at which the thickness is small, moves and rotates until h1 and h2 are in surface contact with the lower face of upper mold 10.

[0023] In the condition shown in Fig. 1D, injection of synthetic resin, etc. via gate 11 is performed and the interior of cavity 12 becomes filled with synthetic resin.

[0024] Fig. 1E shows the condition where the mold has been opened after the elapse of a predetermined amount of time for cooling (solidification) of the filled synthetic resin, and the molded product 60 is taken out by automatic or manual operation. The hydraulic ejector 40 is operated in conjunction with the opening of the mold and shaft 41 is lowered to drop movable supporting member 30 to the bottom part of recessed part 21. However, the operation may be performed in the order of mold opening → removal of molded product 60 → dropping of movable supporting member 30.

[0025] Fig. 1F shows the return to the initial condition, in other words, the condition shown in Fig. 1A. One cycle of injection molding is thus completed.

[0026] Of the above cycle, a description shall now be given to aid the understanding of the functions and actions of the condition shown in Fig. 1D, that is, the process of mold clamping → driving of hydraulic ejector 40 → raising of shaft 41 by point contact → raising and tilting of movable supporting member 30.

[0027] As shown in Fig. 1A, the side wall of recessed part 21, formed in lower mold 20, is formed in an inclined manner so that recessed part 21 becomes smaller in diameter in the downward direction. Thus when movable supporting member 30 is positioned at the lower side of recessed part 21, the side wall of recessed part 21 and the side face of movable supporting member 30 are in close contact, and when as shown in Fig. 3, movable supporting member 30 is pushed and positioned at the upper side of recessed part 21, a gap of a few μm to a few hundred microns, preferably a gap of few dozen μm to a few hundred μm, and more preferably a gap S of approximately 50μm to 100μm forms between the side wall of recessed part 21 and the side face of movable supporting member 30. In the case where the set insert 50 has a thickness difference h3 equal to h2 - h1, the thickness difference h3 is absorbed by the above mentioned gap S upon tilting of movable supporting member 30 about the point of support by shaft 41, and since the upper face of insert 50 will thus come in close contact with the bottom face of upper mold 10, differences with respect to an insert 50 machined at high precision will not pose a problem.

[0028] The above-described action is realized by the existence of the gap S and the supporting of the lower face of movable supporting member 30 by point contact with the tip of shaft 41 of hydraulic ejector 40. Due to this reason, even when there is a difference h3 in the thickness of insert 50, the upper face of insert 50 can be tilted by an amount such that it will be in uniform surface contact with the lower face of upper mold 10.

[0029] Though movable supporting member 30 can be arranged to be able to tilt by supporting the lower face of movable supporting member 30 with a plurality of springs, etc. upon providing a gap S between the side wall of recessed part 21 and the side wall of movable supporting member 30, with such an arrangement, the pressing force of the springs will be fixed and cannot accommodate for the thickness difference h3 of a plurality of types of insert 50. Also, though an arrangement wherein the pressing force of the springs is made adjustable is also possible, such an arrangement, even if employed, will not be practical at all since the spring pressing force must be adjusted each time upon detecting the thickness difference h3 of an insert 50 for each insert to be set. Though an arrangement wherein the adjustment of the spring pressing force is performed by an automatic mechanism can also be considered, the spring pressing force cannot be adjusted automatically unless the thickness difference h3 of an insert 50 is detected each time an insert is set inside the mold.

[0030] A comparison of such hypothetical arrangements clearly show that the arrangement of the present invention is superior in that when the insert 50 that is set has a thickness difference h3, the thickness difference h3 can be absorbed simply by the tilting of movable supporting member 30 and thus without the provision of any special detection means.

[0031] Though a single-cavity type mold was described above as an example of an insert molding mold of this invention, this invention may obviously be applied to a multiple-cavity type mold for performing the injection molding of two or more molded products. Needless to say, in this case, each movable supporting member 30 is not affected by the movements of the other movable supporting members 30.

[0032] Obviously with the above-described embodiment, the upper mold may be arranged as a movable mold and the lower mold as a fixed mold. Such an embodiment is the same as the above-described embodiment except for the fact that the mold clamping illustrated in Fig. 1C is performed by moving upper mold 10 in the direction of approaching lower mold 20, and the mold opening illustrate in Fig. 1F is performed by moving
An insert molding method, wherein an upper mold 10 in the direction away from lower mold 20.

Besides the embodiments described above, an embodiment is also possible wherein, for example, the recessed part 21 formed in lower mold 20 has a substantially vertical side face, the side face of movable supporting member 30 is also substantially vertical, and a gap S is provided between the side faces of both components. With such an arrangement, the side face of movable supporting member 30 can be arranged as a smooth surface of uniform diameter or, for example, just a part (preferably just the upper end part) can be arranged as a protruded part as with the side face of the movable supporting member 30 shown in Fig. 1A.

An insert molding mold of this invention provides the following effects.

Since in the mold clamping process, movable supporting member 30 is pushed up by point contact with the tip of shaft 41 of hydraulic ejector 40 to cause insert 50 to contact the bottom face of upper mold 10, even when the insert 50 is not accurately dimensioned, correction can be performed to accommodate for deviations in the setting of the insert and deformation of the insert.

Burr will not tend to form on the molded product.

An insert molding mold of this invention can be used when the insert 50 is made of glass, carbon, or other type of material that is easily breakable.

Whereas with injection molding using a prior art insert molding mold, mold clamping was performed at a significantly higher pressure than the injection pressure in order to prevent the occurrence of burrs, with an insert molding mold of this invention, better molding can be performed at a floating pressure that is the same as or just slightly greater than the injection pressure.

Claims

1. An insert molding method, wherein an upper mold (10) and a lower mold (20) are disposed so as to oppose each other and a cavity (12) at the upper mold side is filled with molten resin or rubber material that is injected through a gate (11) to perform injection molding of the resin or rubber around or upon an insert (50) set at the lower mold side, said insert molding method being characterized in that a movable supporting member (30) which supports said insert (50) is fitted into a recessed part (21) formed on the upper face of said lower mold (20), the movable supporting member (30) is supported tiltably on its lower face and pressed towards the upper mold side by the tip of a shaft (41) of a pressing mechanism, and a gap (5) exists between the side face part of said recessed part (21) and the side face part of the movable supporting member (30) to enable the movable supporting member (30) to tilt about the point at which it is pressed and supported by said shaft (41) inside said recessed part (21) so that the upper face of the insert (50) will be in uniform surface contact with the lower face of the upper mold (10).

2. An insert molding mold, which is comprised of: (a) an upper mold (10); (b) a lower mold (20) which is disposed so as to oppose the upper mold (10); (c) a recessed part (21) formed on the upper face of said lower mold (20); (d) a movable supporting member (30) which is fitted into the recessed part (21), there being an insert setting part for location of an insert (50) provided on the upper face of the movable supporting member (30); (e) a cavity (12) provided on the mold surface at the lower face of said upper mold (10) that opposes said insert (50); and (f) a gate (11) provided at the upper mold for injection of molten resin or rubber material into the cavity, and arranged for performing injection molding of resin or rubber material around the insert (50) set on the upper face of said movable supporting member by filling of said cavity (12) of the upper mold (10) by injection of the molten resin or rubber material via the gate (11), said insert molding mold characterized in having (g) a pressing mechanism, which has a shaft (41) that tiltably supports said supporting member (30) on its lower face and is operable to press said member (30) towards the upper mold (10); and in that a gap (5) is formed between the side face part of said recessed part (21) and the side face part of the movable supporting member (30), so that said movable supporting member (30) is enabled to tilt about the point of pressing and support by said shaft inside said recessed part so that the upper face of the insert will be in surface contact with the lower face of the upper mold.

3. An insert molding method as set forth in claim 1, wherein the shape defined by the side face of said movable supporting member (30) as viewed in plan is similar to the shape defined by the side face of the insert (50) as viewed in plan.

4. An insert molding mold as set forth in claim 2, wherein the shape defined by the side face of said movable supporting member (30) viewed in plan is similar to the shape defined by the side face of the insert (50) as viewed in plan.

5. An insert molding method as set forth in claim 1 or 3, wherein the gap (5) between the side face part of said recessed part (21) and the side face part of the movable supporting member (30) is large at the side close to the upper mold (10) and small at the side away from the upper mold (10).

6. An insert molding mold as set forth in claim 2 or 4, wherein the gap (5) between the side face part of
said recessed part (21) and the side face part of the movable supporting member (30) is large at the side close to the upper mold (10) and small at the side away from the upper mold (10).

7. An insert molding method as set forth in claim 1 or 3, wherein the gap (5) between the side face part of said recessed part (21) and the side face part of the movable supporting member (30) is arranged to be greatest at the position closest to the upper mold (10) and to decrease gradually and become zero with the distance from the upper mold (10).

8. An insert molding mold as set forth in 2 or 4, wherein the gap (5) between the side face part of said recessed par (21) and the side face part of the movable supporting member (30) is arranged to be greatest at the position closest to the upper mold (10) and to decrease gradually and become zero with the distance from the upper mold (10).

9. A mold or method according to any preceding claim wherein said tip of the shaft (41) of the pressing mechanism supports the movable supporting member (30) at or adjacent a region beneath its center of gravity.

Patentansprüche

1. Verfahren zum Einsatz-Formen, worin eine obere Form (10) und eine untere Form (20) so angeordnet sind, dass sie einander gegenüberliegen, und ein Hohlraum (12) an der Seite der oberen Form mit geschmolzenem Harz- oder Gummimaterial gefüllt wird, das durch einen Einlass (11) zum Spritzgußformen des Harzes oder Gummis um oder auf einen Einsatz (50), der an der Seite der unteren Form angeordnet ist, eingespritzt wird, wobei das Verfahren zum Einsatz-Formen dadurch gekennzeichnet ist, dass ein bewegliches Stützelement (30), das den Einsatz (50) trägt, in einem auf einer oberen Fläche der unteren Form (20) ausgebildeten vertieften Teil (21) eingepasst ist, wobei das bewegliche Stützelement (30) vom Ende eines Schafts (41) eines Drückmechanismus kippbar an seiner unteren Fläche gelagert und in die Richtung der Seite der oberen Form gedrückt wird und ein Spalt (S) zwischen dem Seitenflächenteil des vertieften Teils (21) und dem Seitenflächenteil des beweglichen Stützelements (30) ausgebildet ist, um dem beweglichen Stützelement (30) ein Kippen um den Punkt, an dem es im Inneren des vertieften Teils (21) vom Schaft (41) gedrückt und gelagert wird, zu ermöglichen, sodass die obere Fläche des Nutzraumes (50) in gleichmäßigem Oberflächenkontakt zur Unterseite der oberen Form (10) steht.

2. Form zum Einsatz-Formen, umfassend: (a) eine obere Form (10); eine untere Form (20), die so angeordnet sind, dass sie der oberen Form (10) gegenüberliegt; (c) ein vertiefter Teil (21), der an der oberen Fläche der unteren Form (20) ausgebildet ist; (d) ein bewegliches Stützelement (30), das im vertieften Teil (21) eingepasst ist, wobei ein Einsatz einstellteil zum Positionieren eines Einsatzes (50) an der oberen Fläche des beweglichen Stützelements (30) bereitgestellt ist; einen Hohlraum (12), der an der Formoberfläche an der unteren Fläche der oberen Form (10) angeordnet ist und dem Einsatz (50) gegenüberliegt; und (f) einen Einlass (11), der an der oberen Form zum Einspritzen von geschmolzenem Harz- oder Gummimaterial in den Hohlraum bereitgestellt ist, und der angeordnet ist, um das Spritzgußformen des Harzes- oder Gummimaterials um den Einsatz (50) herum, der an der oberen Fläche des beweglichen Stützelements (30) angeordnet ist, durchzuführen, indem der Hohlraum (12) der oberen Form (10) durch Einspritzen des geschmolzenen Harz- oder Gummimaterials über den Einlass (11) gefüllt wird, wobei die Form zum Einsatz-Formen dadurch gekennzeichnet ist, dass sie (g) über einen Drückmechanismus verfügt, der einen Schaft (41) umfasst, welcher das Stützelement (30) an dessen unteren Fläche kippbar lagert und betätigbar ist, um das Element (30) in Richtung der oberen Form (10) zu drücken; und dass ein Spalt (S) zwischen dem Seitenflächenteil des vertieften Teils (21) und dem Seitenflächenteil des beweglichen Stützelements (30) ausgebildet ist, um dem beweglichen Stützelement (30) ein Kippen um den Punkt, an dem es im Inneren des vertieften Teils vom Schaft gedrückt und gelagert wird, zu ermöglichen, sodass die obere Fläche des Nutzraumes in Oberflächenkontakt zur Unterseite der oberen Form steht.

3. Verfahren zum Einsatz-Formen nach Anspruch 1, worin die von der Seitenfläche definierte Gestalt des beweglichen Stützelements (30) in der Draufsicht ähnlich der von der Seitenfläche definierten Gestalt des Einsatzes (50) in der Draufsicht ist.


5. Verfahren zum Einsatz-Formen nach Anspruch 1 oder 3, worin der Spalt (S) zwischen dem Seitenflächenteil des vertieften Teils (21) und dem Seitenflächenteil des beweglichen Stützelements (30) an der in der Nähe der oberen Form (10) liegenden Seite groß und an der entfernt von der oberen Form (10) liegenden Seite klein ist.
6. Form zum Einsatz-Formen nach Anspruch 2 oder 4, worin der Spalt (S) zwischen dem Seitenflächen-
teil des vertieften Teils (21) und dem Seitenflächen-
teil des beweglichen Stützelements (30) so ausge-
bildet ist, dass er an deroberen Form (10) liegenden Seite
groß und an der entfernt von der oberen Form (10)
liegenden Seite klein ist.

7. Verfahren zum Einsatz-Formen nach Anspruch 1
oder 3, worin der Spalt (S) zwischen dem Seitenflä-
chen teil des vertieften Teils (21) und dem Seitenflä-
chen teil des beweglichen Stützelements (30) so aus-
egebildet ist, dass er an der oberen Form (10)
nächstgelegenen Stelle am größten ist und lang-
sam abnimmt und mit der Distanz zur oberen Form
(10) gegen null zu geht.

8. Form zum Einsatz-Formen nach Anspruch 2 oder
4, worin der Spalt (S) zwischen dem Seitenflächen-
teil des vertieften Teils (21) und dem Seitenflächen-
teil des beweglichen Stützelements (30) so ausge-
bildet ist, dass er an der oberen Form (10)
nächstgelegenen Stelle am größten ist und lang-
sam abnimmt und mit der Distanz zur oberen Form
(10) gegen null zu geht.

9. Form oder Verfahren nach einem der vorangegan-
gen Ansprüche, worin das Ende des Schaufs (41)
des Drückmechanismus das bewegliche Stützele-
ment (30) an oder angrenzend am Bereich unter-
halb seines Schwerpunkts lagert.

Revendications

1. Procédé de moulage avec des inserts, où un moule
supérieur (10) et un moule inférieur (20) sont dis-
posés de manière à se faire face, et une cavité (12)
avant le moule inférieur, ledit procédé de moulage avec des inserts
étant caractérisé en ce qu'un élément de support mobile
(30) qui supporte le insert (50) est inséré dans une partie évidée (21) formée sur la face su-
périeure dudit moule inférieur (20), l'élément de support mobile (30) est supporté d'une manière
basculante sur sa face inférieure et est poussé vers
le côté du moule supérieur par la pointe d'un arbre
(41) d'un mécanisme de pressage, et un espace (5)
existe entre la partie de face latérale de ladite partie
evidée (21) et la partie de face latérale de l'élément
de support mobile (30) pour permettre à l'élément
de support mobile (30) de basculer autour du point
auquel il est comprimé et supporté par ledit arbre
(41) à l'intérieur de ladite partie évidée (21) de sorte
que la face supérieure de l'insert (50) sera en con-
tact surfacique uniforme avec la face inférieure du
moule supérieur (10).

2. Moule de moulage avec des inserts, qui est consti-
tué de: (a) un moule supérieur (10); (b) un moule
inférieur (20) qui est disposé de manière à se trou-
ver en face du moule supérieur (10); (c) une partie
évidée (21) formée sur la face supérieure dudit
moule inférieur (20); (d) un élément de support mo-
bile (30) qui est inséré dans la partie évidée (21),
an une partie de mise d'insert étant prévue
pour mettre en place un insert (50) prévu sur la face
supérieure de l'élément de support mobile (30); (e)
une cavité (12) réalisée sur la face inférieure du
moule supérieur (10) qui est
opposée audit insert (50); et (f) une entrée (11) réa-
lisée au moule supérieur pour l'injection de résine
fondue ou de matériau de caoutchouc dans la ca-
vité, et agencée pour exécuter le mouillage par in-
jection de la résine ou du matériau de caoutchouc
autour de l'insert (50) placé sur la face supérieure
dudit élément de support mobile en rempissant la-
dite cavité (12) du moule supérieur (10) en injectant
la résine fondue ou le matériau de caoutchouc à tra-
vers l'entrée (11), ledit moule de moulage avec des
inserts étant caractérisé en ce qu'il comporte (g)
un mécanisme de pressage, qui est un arbre (41)
qui supporte d'une manière basculante ledit élé-
ment de support (30) sur sa face inférieure et qui
est apte à presser ledit élément (30) vers le moule
supérieur (10), et en ce qu'un espace (5) est formé
entre la partie de face latérale de ladite partie évi-
dée (21) et la partie de face latérale de l'élément de
support mobile (30) de sorte que ledit élément de
support mobile (30) est apte à basculer autour du
point de pression et est supporté par ledit arbre à
l'intérieur de ladite partie évidée de telle sorte que
la face supérieure de l'insert sera en contact surfa-
cique avec la face inférieure du moule supérieur.

3. Procédé de moulage avec des inserts selon la re-
vendication 1, où la forme définie par la face latérale
dudit élément de support mobile (30), vue en plan,
est similaire à la forme définie par la face latérale
de l'insert (50), vue en plan.

4. Moule de moulage avec des inserts selon la re-
vendication 2, où la forme définie par la face latérale
dudit élément de support mobile (30), vue en plan,
est similaire à la forme définie par la face latérale
de l'insert (50), telle vue en plan.

5. Procédé de moulage avec des inserts selon la re-
vendication 1 ou 3, où l'espace (5) entre la partie
de face latérale de ladite partie évidée (21) et la par-
tie de face latérale de l'élément de support mobile
(30) est grand au côté proche du moule supérieur
(10) et petit au côté éloigné du moule supérieur (10).

6. Moule de moulage avec des inserts selon la revendication 2 ou 4, où l'espace (5) entre la partie de face latérale de ladite partie évidée (21) et la partie de face latérale de l'élément de support mobile (30) est grand au côté proche du moule supérieur (10) et petit au côté éloigné du moule supérieur (10).

7. Procédé de moulage avec des inserts selon la revendication 1 ou 3, où l'espace (5) entre la partie de face latérale de ladite partie évidée (21) et la partie de face latérale de l'élément de support mobile (30) est agencé pour être le plus grand à la position la plus proche du moule supérieur (10) et pour diminuer progressivement jusqu'à devenir zéro relativement à la distance du moule supérieur (10).

8. Moule de moulage avec des inserts selon la revendication 2 ou 4, où l'espace (5) entre la partie de face latérale de ladite partie évidée (21) et la partie de face latérale de l'élément de support mobile (30) est agencé pour être le plus grand à la position la plus proche du moule supérieur (10) et pour diminuer progressivement jusqu'à devenir zéro relativement à la distance du moule supérieur (10).

9. Moule ou procédé selon l'une des revendications précédentes, où ladite pointe de l'arbre (41) du mécanisme de pressage supporte l'élément de support mobile (30) à ou adjacent à une région en dessous de son centre de gravité.
FIG. 1

A 10 11
  12
20 21 30
  40 41

B 50

C 50
  30

D 10 11
  12
20 30 21
  40

E 60

F