What is claimed is:

1. An apparatus usable with an injection molder for producing articles, comprising:

a first mold support comprising a first mold;

a second mold support comprising a second mold and a first die;

the first mold support movable relative to the second mold support between a first position and a second position;

wherein in the first position, the first mold and the second mold being brought together to form an injection molded article comprising a body having at least one protrusion extending outwardly from the body and facing the second mold;

wherein in the second position, the first mold and the first die being brought together to subsequently form the article, the first die selectively subsequently forming an altered cross sectional region in at least a portion of the protrusion, forming an undercut in the altered cross sectional region or between the altered cross sectional region of the subsequently formed protrusion and the body.

2. The apparatus of claim 1, wherein the first mold support is rotatably movable about an axis relative to the second mold support.

3. The apparatus of claim 1, wherein the first mold support is movable along a line relative to the second mold support.

4. The apparatus of claim 1, wherein at least the first mold support comprises a plurality of first molds and the second mold support comprises at least one second mold and at least one first die, the apparatus operable such that once the first mold and the second mold have been brought together to form the article (the first position), when the first mold and the first die are then brought together to subsequently form the article (the second position), another first mold and the second mold are substantially simultaneously brought together to form another article (a third position).

5. The apparatus of claim 4, wherein the corresponding first molds, second mold(s) and first die(s) of the apparatus operate continuously to subsequently form previously formed articles while substantially simultaneously forming additional articles.

6. The apparatus of claim 1, wherein the protrusion comprises an open geometry.

7. The apparatus of claim 1, wherein the protrusion comprises a closed geometry.

8. The apparatus of claim 1, wherein the first die is brought into a predetermined range of at least one position relative to the protrusion for a corresponding predetermined range of time for subjecting the at least a portion of the protrusion to one or more of a predetermined temperature range and a predetermined pressure range for forming the undercut.

9. The apparatus of claim 8, wherein the temperature of portions of the first die is selectively controllable for the predetermined range of at least one position and the corresponding predetermined range of time.

10. The apparatus of claim 1, wherein the article is formed from a ceramic, metal, plastic material or a combination thereof.

11. The apparatus of claim 8, wherein the first die selectively controls a surface feature of the at least a portion of the protrusion.

12. The apparatus of claim 1, wherein the article is an orthodontic bracket.

13. An apparatus usable with an injection molder for producing articles, comprising:

a first mold support comprising at least two first molds;

a second mold support comprising at least two second molds and at least two first dies;

the first mold support rotatably movable relative to the second mold support between a first position and a second position;

wherein in the first position, each of the corresponding first molds and second molds being brought together to form an injection molded article comprising a body having at least one protrusion extending outwardly from the body and facing the second mold;

wherein in the second position, each of the corresponding first molds and first dies being brought together to subsequently form the article, each first die selectively subsequently forming an altered cross sectional region in at least a portion of the protrusion, forming an undercut in the altered cross sectional region or between the altered cross sectional region of the subsequently formed protrusion and the body.

14. The apparatus of claim 13, wherein the corresponding first molds, second molds and first dies of the apparatus operate continuously to subsequently form previously formed articles while substantially simultaneously forming additional articles.

15. The apparatus of claim 13, wherein each first die is brought into a predetermined range of at least one position relative to the corresponding protrusion for a corresponding predetermined range of time for subjecting the at least a portion of the protrusion to one or more of a predetermined temperature range and a predetermined pressure range for forming the undercut.

16. The apparatus of claim 15, wherein the temperature of portions of the first die is selectively controllable for the predetermined range of at least one position and the corresponding predetermined range of time.

17. The apparatus of claim 13, wherein the article is formed from a ceramic, a metal, a plastic or a combination thereof.

18. The apparatus of claim 15, wherein the first die selectively controls a surface feature of the at least a portion of the protrusion.

19. The apparatus of claim 13, wherein the article is an orthadontic bracket.

20. A method of producing injection molded articles, comprising:

providing a first mold support comprising a first mold, a second mold support comprising a second mold and a first die,

bringing the first mold support and the second mold support together, the first mold and the second mold being brought together to form an injection molded article therebetween, the article having at least one protrusion facing the second mold;

moving the first mold support away from the second mold support;

moving the first mold support relative to the second mold support;

bringing the first mold support and the second mold support together, the first mold and the first die being brought together to subsequently form the article, the first die selectively subsequently forming an altered cross sectional region in at least a portion of the protrusion, forming an undercut in the altered cross sectional region

or between the altered cross sectional region of the subsequently formed protrusion and the body.

21. The method of claim 20, wherein providing a first mold support comprises a plurality of first molds, and subsequent to moving the first mold support relative to the second mold support, bringing the first mold support and the second mold support together such that once the first mold and the second mold have been brought together to form the article, when the first mold and the first die are then brought together to subsequently form the article, another first mold and the second mold are substantially simultaneously brought together to form another article.

Claims

1. An apparatus usable with an injection molder for producing articles wherein the article is an orthodontic bracket, comprising:
a first mold support comprising a first mold;
a second mold support comprising a second mold and a first die;
the first mold support movable relative to the second mold support between a first position and a second position;
wherein in the first position, the first mold and the second mold being brought together to form an injection molded article comprising a body having at least one protrusion extending outwardly from the body and facing the second mold;
wherein in the second position, the first mold and the first die being brought together to subsequently form the article, the first die selectively subsequently forming an altered cross sectional region in at least a portion of the protrusion, forming an undercut in the altered cross sectional region or between the altered cross sectional region of the subsequently formed protrusion and the body wherein the first mold support is rotatably movable about an axis relative to the second mold support.

2. The apparatus of claim 1, wherein at least the first mold support comprises a plurality of first molds and the second mold support comprises at least one second mold and at least one first die, the apparatus operable such that once the first mold and the second mold have been brought together to form the injection molded article (the first position), when the first mold and the first die are then brought together to subsequently form the article (the second position), another first mold and the second mold are substantially simultaneously brought together to form another article (a third position).

3. The apparatus of claim 2, wherein the corresponding first molds, second mold(s) and first die(s) of the apparatus operate continuously to subsequently form previously formed articles while substantially simultaneously forming additional articles.

4. The apparatus of claim 1, wherein the first die is brought into a predetermined range of at least

one position relative to the protrusion for a corresponding predetermined range of time for subjecting the at least a portion of the protrusion to one or more of a predetermined temperature range and a predetermined pressure range for forming the undercut.

5. The apparatus of claim 4, wherein the temperature of portions of the first die is selectively controllable for the predetermined range of at least one position and the corresponding predetermined range of time.

6. The apparatus of claim 4, wherein the first die selectively controls a surface feature of the at least a portion of the protrusion.

7. An apparatus usable with an injection molder for producing articles wherein the article is an orthodontic bracket, comprising:
a first mold support comprising at least two first molds;
a second mold support comprising at least two second molds and at least two first dies;
the first mold support rotatably movable relative to the second mold support between a first position and a second position;
wherein in the first position, each of the corresponding first molds and second molds being brought together to form an injection molded article comprising a body having at least one protrusion extending outwardly from the body and facing the second mold;
wherein in the second position, each of the corresponding first molds and first dies being brought together to subsequently form the article, each first die selectively subsequently forming an altered cross sectional region in at least a portion of the protrusion, forming an undercut in the altered cross sectional region or between the altered cross sectional region of the subsequently formed protrusion and the body wherein the first mold support is rotatably movable about an axis relative to the second mold support.

8. The apparatus of claim 7, wherein the corresponding first molds, second molds and first dies of the apparatus operate continuously to subsequently form previously formed articles while substantially simultaneously forming additional articles.

9. The apparatus of claim 7, wherein each first die is brought into a predetermined range of at least one position relative to the corresponding protrusion for a corresponding predetermined range of time for subjecting the at least a portion of the protrusion to one or more of a predetermined temperature range and a predetermined pressure range for forming the undercut.

10. The apparatus of claim 9, wherein the temperature of portions of the first die is selectively controllable for the predetermined range of at least one position and the corresponding predetermined range of time.

11. The apparatus of claim 9, wherein the first die selectively controls a surface feature of the at least a portion of the protrusion.

12. A method of producing injection molded articles wherein the article is an orthodontic bracket, comprising:
providing a first mold support comprising a first mold, a second mold support comprising a second mold and a first die,
bringing the first mold support and the second mold support together, the first mold and the second mold being brought together to form an injection molded article therebetween, the article having at least one protrusion facing the second mold;
moving the first mold support away from the second mold support;
moving the first mold support relative to the second mold support;
bringing the first mold support and the second mold support together, the first mold and the first die being brought together to subsequently form the article, the first die selectively subsequently forming an altered cross sectional region in at least a portion of the protrusion, forming an undercut in the altered cross sectional region or between the altered cross sectional region of the subsequently formed protrusion and the body wherein providing a first mold support comprises a plurality of first molds, and subsequent to moving the first mold support relative to the second mold support, bringing the first mold support and the second mold support together such that once the first mold and the second mold have been brought together to form the article, when the first mold and the first die are then brought together to subsequently form the article, another first mold and the second mold are substantially simultaneously brought together to form another

article and wherein the first mold support is rotatably movable about an axis relative to the second mold support.