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### Helmet provided with a half chin bar

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#### Abstract

A helmet includes a shell and a half chin bar releasably connected to the shell. The half chin bar is selectively connectable and disconnectable to and from the shell by means of an attachment device. The attachment device includes a coupling portion and a manual drive portion for the complete release of said coupling portion. The manual drive portion is accessible from the outside of the shell and/or the outside of the half chin bar.

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## Background/Summary

### CROSS-REFERENCE TO RELATED APPLICATIONS

(1) This application is a Section 371 of International Application No PCT/IB2021/060744, filed Nov. 19, 2021, which was published in the English language on May 27, 2022, under International Publication No. WO 2022/107060 A1, which claims priority under 35 U.S.C. § 119 (b) to Italian Application No. 102020000027792, filed Nov. 19, 2020, the disclosures of each of which are incorporated herein by reference.

### FIELD OF THE INVENTION

(2) The present invention concerns a protective helmet provided with a half chin bar that can be used in the automotive sector of racing and sports competitions, specifically in, but not limited to, the rally sector. However, applications of the present invention are not excluded also in the field of

sports motorcycling or in other sectors that envisage the use of protective helmets.

## BACKGROUND OF THE INVENTION

(3) In sports car racing, the use is known of a protective helmet by a user, for example a driver and/or co-driver navigator.

(4) Typically, the helmet comprises a protective cap, or shell, which has a lower aperture to insert the head and a front aperture suitable to guarantee a field of vision for the user.

(5) So-called integral helmets exist, in which the front aperture appears as a band in the zone surrounding the eyes, limited at the bottom by an element to protect the chin, also called chin bar, continuous on one side and the other of the shell and integral with it.

(6) Open helmets, or “jet helmets”, are also known, in which the chin bar is not normally provided, and in which the front and bottom aperture constitute a single continuous aperture. These helmets have the advantage that they give greater comfort and freedom to the user, while providing less protection than full-face helmets.

(7) In sports car racing, in particular in the rally sector, the use of a particular helmet is known in which there is a half chin bar formed by a monolithic arm that extends cantilevered from one side of the front aperture and substantially terminating in correspondence with the user's mouth.

(8) An important aspect related to helmets provided with a half chin bar is linked to their lack of safety during motor racing, especially in the event of an accident.

(9) For example, in the event of an accident, the half chin bar can attach itself to elements present in the passenger compartment, such as the spokes of the steering wheel, belts, arms, roll bars, or even to flying objects moved in the passenger compartment. In such circumstances, the attachment of the half chin bar can cause torsional impulses, or even real torsions of the entire helmet, which affect the user's vertebrae.

(10) It is also known that the half chin bar must be able to be removed, or at least distanced, from the user's face quickly and easily in the phases immediately following an accident, moving the user's head and neck as little as possible, so as not to risk aggravating any possible injuries.

(11) Removing or moving the half chin bar may in fact be necessary to facilitate breathing, or to perform rescue operations, such as the application of an external respirator or an oxygen mask.

(12) One disadvantage of known helmets is that, in these circumstances, the half chin bar can represent an obstacle for access to the user's face by rescuers.

(13) Some solutions provide to use mobile half chin bars, for example hinged on the lateral portions of the shell of the helmet and rotatable upward or downward.

(14) These solutions have the disadvantage that, in the event that the accident involves impacts or collisions in correspondence with the portions in which the half chin bar is pivoted to the shell, rotation could be limited or prevented.

(15) Other known solutions provide that the half chin bar comprises a yielding portion, for example made of a softer (or more fragile) material than the material of which the other portions of the helmet are made and/or that comprises preferential breaking profiles.

(16) In these cases, in the event of an accident, the yielding portion of the half chin bar could promote its detachment, effectively transforming it into a blunt instrument that could cause injury to the user. On the other hand, if the half chin bar remains connected to the helmet, in order to remove it rescuers must apply sufficient force to break the yielding portion, with the risk of causing, or aggravating, any injuries possibly sustained by the user.

(17) These solutions also have the disadvantage that the helmet cannot be reused following accidental breakage or slight damage of the yielding portion.

(18) Solutions are also known in which the half chin bar is connected to the helmet by means of mechanical connection elements. Generally, in these solutions, both for aesthetic and functional reasons, the connection elements are disposed inside the shell or, at least, are covered by protection elements, such as plastic caps in turn connected to the shell. In the event of an accident, these solutions are particularly disadvantageous since, in order to remove the half chin bar, tools are

required, such as screwdrivers or mechanical wrenches, suitable to maneuver the connection elements. These tools may not be immediately available to rescuers, thus slowing down rescue operations.

(19) There is therefore a need to perfect a helmet which can overcome at least one of the disadvantages of the state of the art.

(20) It is therefore a purpose of the present invention to provide a helmet which is safer than helmets known in the state of the art, in particular in the event of an accident.

(21) In particular, one purpose of the present invention is to provide a helmet in which the half chin bar can be removed quickly and easily from the user's face, in particular in the event of an accident.

(22) Another purpose of the present invention is to provide a helmet in which the half chin bar can be removed without the use of tools.

(23) Another purpose of the present invention is to achieve the above purposes, and others besides, without compromising the safety of the helmet, and in particular the characteristics of resistance to impacts.

(24) The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

#### SUMMARY OF THE INVENTION

(25) The present invention is set forth and characterized in the independent claim. The dependent claims describe other characteristics of the present invention or variants to the main inventive idea.

(26) In accordance with the above purposes, a helmet provided with a half chin bar is described, hereafter helmet, which overcomes the limits of the state of the art and eliminates the defects present therein.

(27) In accordance with some embodiments, a helmet is provided comprising a shell suitable to contain the head of a user inside it.

(28) According to one aspect of the invention, the helmet also comprises a half chin bar selectively connectable/disconnectable to/from the shell by means of an attachment device comprising a coupling portion and a manual drive portion for the complete release of the coupling portion, accessible from the outside of the shell and/or of the half chin bar. In particular, the half chin bar can be connected/disconnected to/from the shell by a user, by manually acting on the manual drive portion of the attachment device.

(29) By virtue of the fact that the manual drive portion is disposed outside the shell and does not require specific tools to be maneuvered, the removal of the half chin bar is simple and immediate.

(30) In preferred embodiments, the attachment device comprises a first attachment element, with which the manual drive portion is integral, and which is suitable to couple to a second attachment element integrated in the shell. In addition, the half chin bar can comprise a passage hole mating with the second attachment element, and, in an attached configuration, the first attachment element passes through the passage hole and is engaged with the second attachment element.

(31) The first attachment element can also comprise a flange suitable to press the half chin bar toward the shell when the helmet is in the attached configuration and, in preferred embodiments, the manual drive portion is disposed in the proximity of the flange. In particular, the manual drive portion can comprise a gripping flap manually mobile from a passive position, in which it is substantially parallel to the half chin bar, to a drive position, in which it is substantially perpendicular to the half chin bar.

(32) Preferably, the half chin bar can develop in a single body from a free end to an attachment end and the shell can comprise an attachment seating with a shape at least partly mating with that of the attachment end.

(33) Furthermore, in some embodiments, the attachment seating comprises interlocking means suitable to define a same-shape coupling between the half chin bar and the shell. In particular, the attachment end of the half chin bar can comprise at least one shaped protruding part suitable to be inserted in a suitable hollow comprised in the interlocking means.

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## Description

### BRIEF DESCRIPTION OF THE DRAWINGS

(1) These and other aspects, characteristics and advantages of the present invention will become apparent from the following description of some embodiments, given as a non-restrictive example with reference to the attached drawings wherein:

(2) FIGS. from **1** to **4** are schematic representations of a helmet according to the present invention in different operating conditions;

(3) FIGS. **5** and **6** are schematic representations of a section of the helmet of the present invention in different operating conditions.

(4) To facilitate comprehension, the same reference numbers have been used, where possible, to identify identical common elements in the drawings. It is understood that elements and characteristics of one embodiment can conveniently be combined or incorporated into other embodiments without further clarifications.

### DETAILED DESCRIPTION OF SOME EMBODIMENTS

(5) We will now refer in detail to the possible embodiments of the invention, of which one or more examples are shown in the attached drawings, by way of a non-limiting illustration. The phraseology and terminology used here is also for the purposes of providing non-limiting examples.

(6) Referring to FIGS. **1-4**, the number **10** indicates a helmet **10** provided with a half chin bar **14**, hereafter helmet **10**, which satisfies the purposes described above.

(7) The helmet **10** described here can be used preferably in the field of motor racing, but also in other fields, such as for example motorcycling or the practice of winter sports, such as skiing or snowboarding, or even the practice of paragliding or other sports activities, either civilian or professional, which require the use of protective helmets of the type in question.

(8) The helmet **10** of the present invention comprises a shell **11** suitable to wrap at least a portion of a user's skull and a padding **12** provided inside the shell **11**. During use, a portion of the user's skull is inside the shell **11** and adheres to the padding **12**.

(9) The shell **11** can be provided with a pair of lateral extensions **13a**, **13b** which at least partly wrap the lateral parts of the user's skull, and which laterally delimit a front aperture of the helmet **10**. The shell **11** and the lateral extensions **13a**, **13b** can be made in a single body and with materials suitable to provide protection to the user in the event of an accident, for example polymer materials, resins, composite materials, carbon fiber, or combinations thereof.

(10) On the other hand, the padding **12** can be made of materials suitable to improve comfort for the user and to partly absorb shocks and impacts associated with possible accidents.

(11) The helmet **10** also comprises a half chin bar **14** associated with the shell **11**, in particular with one of the lateral extensions **13a**, **13b**. It is clear that a half chin bar **14** can be mounted indifferently on one or on the other of the lateral extensions **13a**, **13b**.

(12) The half chin bar **14** can comprise a covering layer, for example made of polymer material, composite material or carbon fiber, and one or more plastic bodies, which can be conformed to give the half chin bar **14** suitable shapes and sizes. Furthermore, the half chin bar **14** can comprise a microphone and/or bodies or assemblies configured to house and/or serve the microphone, such as for example a filter to reduce background noise during transmission, devices for improving the quality of the audio signal, electric power cables, digital processing devices and more.

(13) According to some embodiments, the half chin bar **14** is mounted in a cantilevered releasable way and protruding with respect to the shell **11**, and extends from a free end **14a** positioned, during use, in correspondence with the user's mouth to an attachment end **14b** associated with the shell **11**.

(14) According to one aspect of the invention, the half chin bar **14** is connectable/disconnectable to/from the shell **11** by means of an attachment device **16** comprising a coupling portion **20** and a

manual drive portion **17**. In particular, the manual drive portion **17** is suitable for the complete release of the coupling portion **20** and is accessible from the outside of the shell **11** and/or of the half chin bar **14**.

(15) By virtue of this, it is possible to define an attached configuration of the helmet **10** in which the half chin bar **14** is connected to the shell **11**, and a detached configuration of the helmet **10** in which the half chin bar **14** is disconnected from the shell **11**. In particular, in the attached configuration the manual drive portion **17** of the attachment device **16** is outside the shell **11**.

(16) By way of a non-limiting example, FIG. **1** shows the helmet **10** in the attached configuration, while FIG. **4** shows the helmet **10** in the detached configuration.

(17) In some embodiments, the attachment device **16** can comprise a first attachment element **18** suitable to couple to a second attachment element **19** integrated in the shell **11**.

(18) In this specific case, with reference to FIGS. **5-6**, the first attachment element **18** and the second attachment element **19** respectively comprise a threaded shank and a threaded hole **20b**, which constitute the coupling portion **20**.

(19) Purely by way of example, the second attachment element **19** can be directly laminated into the shell **11** during the manufacturing thereof or, alternatively, inserted therein through deformation.

(20) Furthermore, the half chin bar **14** can also comprise a passage hole **22** for the first attachment element **18**. In particular, in the attached configuration of the helmet **10**, the passage hole **22** can be substantially overlapping with the second attachment element **19** and is passed through by the first attachment element **18** which, with the threaded shank **20a**, engages the threaded hole **20b** of the second attachment element **19**.

(21) According to some embodiments, the first attachment element **18** can comprise a flange **21** disposed substantially opposite to the threaded shank **20a**. The flange **21** acts on the half chin bar **14** by pressing it from the outside toward the shell **11** (FIG. **5**), stabilizing its connection. In other words, in the attached configuration, the half chin bar **14** is interposed between the flange **21** and the shell **11**.

(22) In accordance with preferred embodiments, the manual drive portion **17** of the attachment device **16** is integral with the first attachment element **18** and is disposed substantially in correspondence with the flange **21**.

(23) This conformation is advantageous since, in the attached configuration of the helmet **10**, the manual drive portion **17** is outside the shell **11**, making the attachment device **16** immediately accessible. This allows rescuers to remove the half chin bar **14** safely, easily and quickly in the event of an accident, without requiring the helmet **10**, and therefore the user's head, to be subjected to significant exertions that could compromise the health of the user.

(24) In this specific case, the manual drive portion **17** can comprise a gripping flap **23** manually mobile from a passive position to a drive position. In the passive position, the gripping flap **23** is substantially parallel to the flange **21** (FIG. **5**), while during use it is substantially perpendicular to the flange **21** (FIG. **6**). When the gripping flap **23** is in use, that is, in the drive position, the manual drive portion **17**, and therefore the first attachment element **18**, can be maneuvered manually without requiring the use of screwdrivers or special tools. This further speeds up any rescue interventions, allowing, for example, to reduce the time required to clear the respiratory tract of the user of the helmet **10**.

(25) In some embodiments, at least one of the lateral extensions **13a**, **13b** of the shell **11** can comprise an attachment seating **15** suitable to accommodate the attachment end **14b** of the half chin bar **14**. The attachment seating **15** can be of a shape at least partly mating with that of the attachment end **14b** of the half chin bar **14**. In particular, the attachment seating **15** can be configured as a hollow made in the shell **11**, the perimeter **P** of which at least partly follows that of the attachment end **14b**.

(26) This conformation is advantageous since it allows to facilitate the centering of the passage

hole **22** with the second attachment element **19** during the connection of the half chin bar **14** to the shell **11**.

(27) In other embodiments, the attachment seating **15** can comprise interlocking means **24** suitable to define a same-shape coupling with the attachment end **14b** of the half chin bar **14**. In fact, the attachment end **14b** can comprise one or more protruding parts **25** with a shape mating with the interlocking means **24**. In particular, with reference to FIGS. 5-6, the protruding part **25** can be inserted in a suitable hollow **26** comprised in the interlocking means **24**.

(28) This conformation allows to define a preliminary alignment coupling between the half chin bar **14** and the shell **11**, facilitating the subsequent insertion of the first attachment element **18** in the passage hole **22** and in the second attachment element **19**.

(29) Once inserted, the first attachment element **18** can be manually maneuvered by means of the manual drive portion **17** and in particular the gripping flap **23**, in order to engage the threaded hole **20b** of the second attachment element **19** with the threaded shank **20a**.

(30) For example, the first attachment element **18** can be screwed manually by acting through the gripping flap **23**. Once the coupling between the first attachment element **18** and the second attachment element **19** has been defined, the gripping flap **23** can be taken from the drive position to the passive position.

(31) On the other hand, in order to disconnect the half chin bar **14**, a user can manually take the gripping flap **23** from the passive position to the drive position, and by means of the same gripping flap **23** manually maneuver the first attachment element **18** in order to disengage it from the second attachment element **19**.

(32) For example, the first attachment element **18** can be manually unscrewed by acting through the gripping flap **23**. Once disengaged from the second attachment element **19**, the first attachment element **18** can be extracted from the passage hole **22** and the half chin bar **14** can be disconnected from the shell **11**.

(33) The person of skill in the art will easily understand that the half chin bar **14** can be connected/disconnected several times from the shell **11** without compromising the solidity and resistance characteristics of the helmet **10**. This allows to replace the half chin bar **14** whenever necessary, for example if slightly damaged or, on each occasion, depending on the use of the helmet **10**.

(34) It is clear that modifications and/or additions of parts may be made to the helmet **10** as described heretofore, without departing from the field and scope of the present invention as defined by the claims.

(35) In the following claims, the sole purpose of the references in brackets is to facilitate reading: they must not be considered as restrictive factors with regard to the field of protection claimed in the specific claims.

## Claims

1. A helmet (**10**) comprising a shell (**11**) and a half chin bar (**14**) releasably connected to said shell (**11**), wherein said half chin bar (**14**) is selectively connectable/disconnectable to/from said shell (**11**) by means of an attachment device (**16**) comprising a coupling portion (**20**) and a manual drive portion (**17**) for a complete release of said coupling portion (**20**), said manual drive portion (**17**) being accessible from an outside of said shell (**11**) and/or of said half chin bar (**14**), wherein said half chin bar (**14**) develops from a free end (**14a**) to an attachment end (**14b**), wherein said shell (**11**) comprises an attachment seating (**15**) with a shape at least partly mating with a shape of said attachment end (**14b**), wherein a first attachment element (**19**) is disposed in said attachment seating (**15**), wherein said attachment seating (**15**) comprises interlocking means (**24**) for coupling said shell (**11**) to the attachment end (**14b**) of the half chin bar (**14**), and wherein said attachment end (**14b**) comprises at least one shaped protruding part (**25**) suitable to be inserted in a suitable

hollow (26) comprised in said interlocking means (24), wherein upon release of said coupling portion (20) of said attachment device (16), the half chin bar (14) is configured to be disconnected from the shell (11) by withdrawal of the at least one shaped protruding part (25) from the suitable hollow (26).

2. The helmet (10) as in claim 1, wherein said attachment device (16) comprises a second attachment element (18) suitable to couple with said first attachment element (19) integrated in said shell (11) wherein said manual drive portion (17) is integral with said second attachment element (18).

3. The helmet (10) as in claim 2, wherein said half chin bar (14) is connected to said shell (11) in an attached configuration, wherein said half chin bar (14) comprises a passage hole (22) mating with said first attachment element (19) wherein said second attachment element (18) passes through said passage hole (22) engaging with said first attachment element (19).

4. The helmet (10) as in claim 3, wherein said second attachment element (18) comprises a flange (21) suitable to press said half chin bar (14) toward said shell (11) when the helmet (10) is in the attached configuration.

5. The helmet (10) as in claim 1, wherein said manual drive portion (17) comprises a gripping flap (23) manually mobile from a position substantially parallel to a flange (21) to a position substantially perpendicular to said flange (21).

6. The helmet (10) as in claim 5, wherein said manual drive portion (17) is disposed in a proximity of said flange (21).

7. The helmet (10) as in claim 1 wherein said shell (11) comprises two lateral extensions (13a, 13b) laterally defining a front aperture of the helmet (10), wherein said attachment seating (15) is disposed on one of said lateral extensions (13a, 13b) and is configured as a hollow having a perimeter (P) at least partly mating with a perimeter of said attachment end (14b).

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