

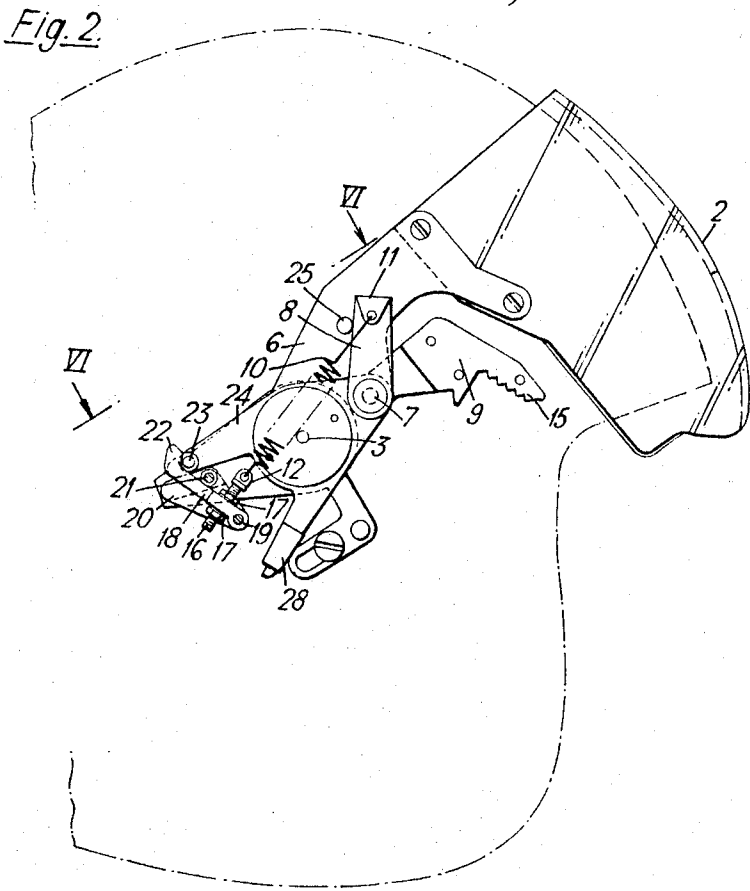
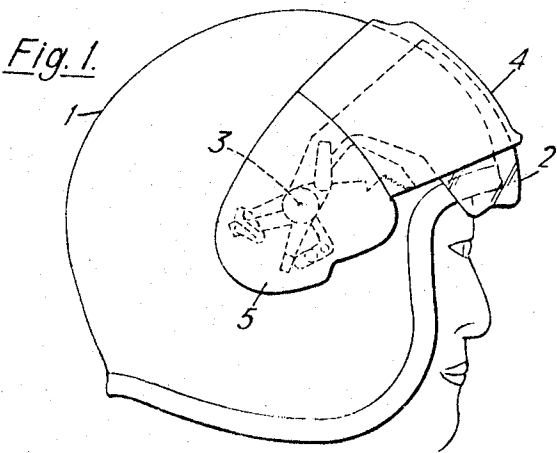
May 21, 1968

M. J. O. LOBELLE
FLYING HELMETS

3,383,706

Filed Nov. 4, 1966

3 Sheets-Sheet 1



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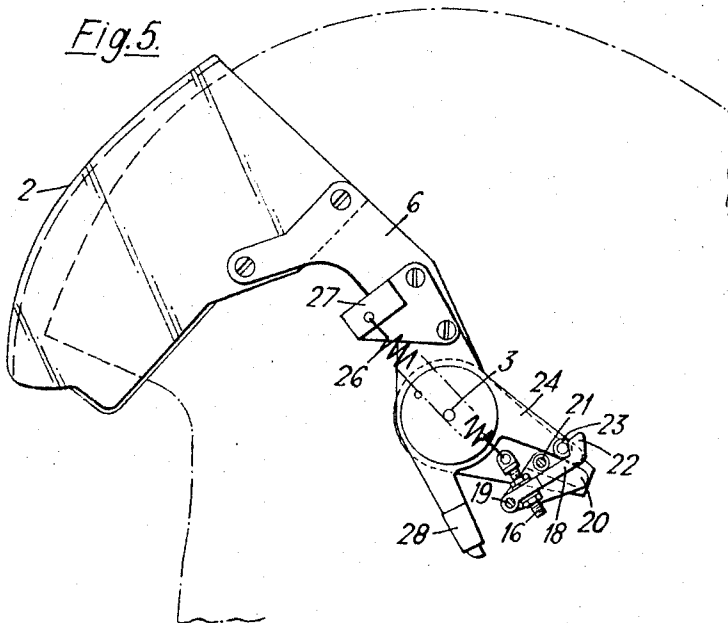
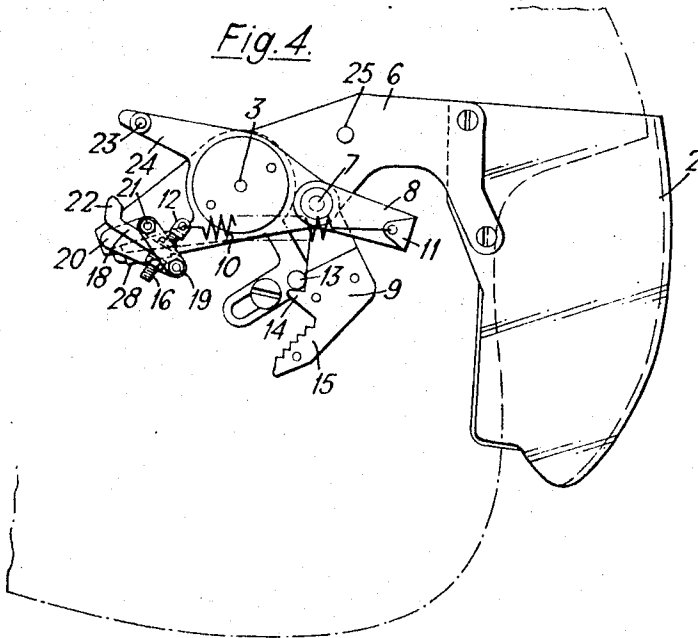
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Filed Nov. 4, 1966

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3,383,706

FLYING HELMETS

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Filed Nov. 4, 1966, Ser. No. 592,166

Claims priority, application Great Britain, Nov. 9, 1965, 47,500/65

5 Claims. (Cl. 2—6)

Some types of flying helmets are fitted with a pivoted visor which when in the lowered position shields the wearer's eyes from the sun. The visor also protects the wearer's face against blasts of air, for instance those which occur when he is ejected from the aircraft by an injection seat. However in the event of ejection in an emergency he may not have the time or opportunity to lower the visor into the closed position, or he may even be unconscious.

According to the present invention a flying helmet of this type includes a lever responsive to G-forces pivoted to the visor about a generally horizontal axis and connected through a spring to the helmet, the spring being anchored at each end at points which are so located in relation to the visor and lever pivot points that a two stage over-centre mechanism is formed, operation through the first stage of which is brought about by manual lowering of the visor into the closed position during which the line of action of the spring is transferred from one side to the other side of the visor pivot point and thus biases the visor into the closed position, the effect of a subsequent G-force equivalent to that which might be experienced by the wearer on being ejected from his aircraft by an injection seat being to cause operation through the second stage, the lever pivoting so that the line of action of the spring is transferred from one side to the other side of the lever pivot point with the result that the lever becomes biased into a position which is such as to cause the visor to be locked in the lower closed position.

With such a construction of helmet the visor is automatically locked into the lower closed position whenever the wearer is subjected to a predetermined G-force, for instance 10 to 12G. Due to the use of the G-forces to bring this about, there can be no possibility of it occurring accidentally or conversely of failure of the visor to be locked at the required instant. Furthermore this construction is such that the visor is lowered as well as locked automatically if it should be in the upper open position at the instant of ejection.

The concept of a two stage over-centre mechanism results in a particularly simple construction of helmet. Few moving parts are required and those which are can be comparatively simple and do not in general involve close tolerances. Accordingly flying helmets in accordance with the invention are normally comparatively simple to manufacture and capable of withstanding rough usage.

By way of example a construction of flying helmet in accordance with the invention will now be described in more detail with reference to the accompanying drawings in which:

FIGURE 1 is a diagrammatic side elevation of the complete helmet;

FIGURE 2 is a view corresponding to the front part of FIGURE 1 but to a larger scale and with the canopy and operating mechanism cover removed and showing the visor in the upper open position;

FIGURE 3 is a view corresponding to FIGURE 2 but with the visor in the lower closed position;

FIGURE 4 is a view corresponding to FIGURES 2 and 3 but after operation in response to a G-force so that the visor is locked in the lower closed position;

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FIGURE 5 is a view corresponding to FIGURES 2 to 4 but showing the other side of the helmet with the visor in the upper open position; and

FIGURE 6 is a sectional view on the line VI—VI in FIGURE 2.

Turning first to FIGURE 1, the helmet itself is indicated in general outline at 1. A protective visor, part of which is seen at 2, is shown in the upper open position and is pivoted to the side of the helmet at 3. Overlying the visor is a lune-shaped canopy 4 which protects the visor when the latter is in the upper open position. The canopy 4 is attached to a cover 5 for the visor operating mechanism, the latter of which will be described with reference to FIGURES 2 to 4 and 6. FIGURE 5 shows the mechanism on the other side of the helmet which is simpler and will be described later.

Turning first to FIGURE 2, the visor 2, which is tinted to shield the wearer's eyes from the sun, includes a pair of side arms 6 (only one visible) which are pivoted at 3 to each side of the helmet 1. A pin 7 is pivotally journaled about a horizontal axis in the side arm 6 forward of the visor pivot 3 and carries at the outer end a lever 8 and at the inner end, that is to say the end adjacent the wearer's head, a lever 9 which is responsive to G-forces and will be referred to as an inertia lever. A suitable weight (not shown) may be attached to the lever 9 depending on the G-force at which it is to operate.

A tension spring 10 is anchored at one end to an anchorage 11 on the lever 8 and at the other end to an anchorage 12. This latter anchorage 12 will be described in detail later but for present purposes, it can be considered as being substantially fixed in relation to the helmet 1.

As has already been stated, the visor 2 is in the upper open position in FIGURE 2 into which it is biased by the spring 10, the lever 8 being held against a stop 25. The visor has rearwardly extending projections 24 and 28 to the side arms 6. When in the upper open position the projection 24 is biased into contact with a rivet 21 secured to the side of the helmet. If the wearer wishes to lower it into the lower closed position, he merely pulls it down. As this occurs the levers 8 and 9 move with the visor side arms 6 without any relative rotation. The tension spring 10 pivots about the anchorage point 12 and the line of action of the spring is transferred from above the visor pivot 3 to below the visor pivot, that is to say to the position shown in FIGURE 3, and the projection 28 contacts the rivet 21. It will be appreciated that when in the latter position, the spring 10 biases the visor 2 into the lower closed position. However the visor is not locked in this position and the wearer can move it upwardly into the open position whenever he desires, movement between the two positions constituting movement through the first stage of a two stage over-centre mechanism.

In the event of the wearer being subsequently subjected to a sufficient downward G-force, that is to say being accelerated upwardly, the inertia lever 9 turns in a clockwise direction and the pin 7 turns in the side arm 6. The G-force required for this to occur may for instance be of the order of 10 to 12G and the strength of the spring 10 and the moment of inertia of the lever 9 are chosen so that the lever overcomes the former at the correct G-force. As the lever 8 and the inertia lever 9 are both secured to the pin 7, the effect is that the tension spring 10 pivots about the anchorage point 12 and the line of action of the spring is transferred from above the axis of the pin 7 to below this axis, that is to say moves through the second stage of the two stage over-centre mechanism. The parts of the operating mechanism take up the positions shown in FIGURE 4 and it can be seen from this that the spring 10 now biases the inertia lever 9 in a clockwise sense.

The inertia lever 9 abuts a pin 13 which is fixed to the helmet 1. A projection 14 on the inertia lever 9 fits under the pin 13 and the result of this is that upward movement of the visor 2 is prevented. It is clear from FIGURE 4 that such upward movement would result in the pin 7 moving upwards and this is prevented by the engagement of the projection 14 with the pin 13. Thus the visor is locked in the lower closed position and as the inertia lever 9 is biased into contact with the pin 13, the possibility of accidental release is almost entirely eliminated.

When the emergency is past or if for any other reason, the wearer wishes to raise the visor 2, it is only necessary to pivot the inertia lever 9 in an anticlockwise direction so as to release the projection 14 from the pin 13. To facilitate this, the inertia lever 9 includes a projection 15 which can easily be gripped by the wearer.

The lowering of the visor has been described in two stages. However, in the event of the wearer being ejected from the aircraft when the visor is in the upper, open position, the two stages just described both occur automatically. Referring to FIGURE 2, the weight of the visor 2 will automatically cause it to pivot into the closed position and in addition the inertia lever 9 will pivot in relation to the side arm 6. Accordingly the spring 10 moves through both stages of the over-centre mechanism and the visor is automatically lowered and locked into the closed position.

The anchorage point 12 is in the form of an eyebolt having a screwed shank 16. The shank carries nuts 17 which enable its position in relation to a lever 18 through which it passes to be adjusted so as to adjust the force exerted by the spring 10. The lever 18 is pivoted at 19 to a plate 20 which is riveted to the helmet 1 by the rivet 21. The lever 18 has an upturned end 22 and as shown in FIGURE 2, this end engages with a pin 23 on a projection 24 of the side arm 6. This arrangement constitutes a latch which biases the visor into the upper open position. It will be appreciated that downward movement of the visor necessitates that the lever 22 should pivot in an anticlockwise sense which in turn necessitates that the spring 10 should be extended slightly. The latch operates in addition to the normal bias provided by the spring 10 and reduces the possibility of the visor being accidentally closed.

Reference to FIGURE 5 shows the other side of the helmet with the cover which normally covers the mechanism and the canopy 4 removed. The mechanism includes a tension spring 26 which is anchored at one end to an anchorage 27 attached to the side arm 6. The other end of the spring 26 is anchored in the same way as the corresponding end of the spring 10 on the other side of the helmet and therefore this will not be described, although the corresponding reference numerals are shown for reference purposes. It is apparent that as shown in FIGURE 5 with the visor in the upper open position the line of action of the spring 26 is above the visor pivot point 3, as is the line of action of the spring 10 on the other side of the helmet. As the visor is lowered the lines of action of both springs are transferred below the pivot points 3. The springs are identical with one another so that the same bias is applied to the visor on both sides of the helmet.

I claim:

1. A flying helmet fitted with a visor pivoted about a point on said helmet and capable of movement between an upper open position and a lower closed position, the said helmet including a lever responsive to G-forces pivoted at a point on the said visor about a generally horizontal axis, spring means connecting the said lever to the said helmet, and automatic locking means between the said helmet and the visor whereby the said visor can be locked in the lower closed position, the said spring means

being anchored at each end at points so located in relation to the said visor pivot point and the said lever pivot point to constitute a two stage over-centre mechanism, operation through the first stage of the said mechanism being brought about by manual lowering of the said visor into the closed position during which the line of action of the said spring means is transferred from one side to the other side of the said visor pivot point thus biasing the said visor into the closed position, the effect of a subsequent G-force equivalent to that which might be experienced by a wearer of the said helmet on being ejected from an aircraft by an ejection seat being to cause operation through the second stage of the said mechanism, the said lever pivoting so that the line of action of the said spring means is transferred from one side to the other side of the said lever pivot point with the result that the said lever becomes biased into a position which results in operation of the said locking means to lock the said visor in the lower closed position.

2. A flying helmet according to claim 1 including a second lever rigidly connected to the said pivoted lever and to which one end of the said spring means is anchored.

3. A flying helmet according to claim 1 in which one of the said anchorages is adjustable so as to enable the tension of the said spring means to be adjusted.

4. A flying helmet according to claim 1 in which a second pivoted lever is pivoted to the same helmet and anchored to one end of the said spring means, the said second pivoted lever engaging with the said visor so as to restrain the visor in the upper open position.

5. A flying helmet fitted with a visor pivoted about a point on said helmet and capable of movement between an upper open position and a lower closed position, the said helmet including a lever responsive to G-forces pivoted at a point on the said visor about a generally horizontal axis, spring means connecting the said lever to the said helmet, and automatic locking means comprising a projection on the said lever and a cooperating projection on the said helmet whereby the said visor can be locked in the lower closed position, the said spring means being anchored at each end at points so located in relation to the said visor pivot point and the said lever pivot point as to constitute to a two stage over-centre mechanism, operation through the first stage of the said mechanism being brought about by manual lowering of the said visor into the closed position during which the line of action of the said spring means is transferred from one side to the other side of the side visor pivot point thus biasing the said visor into the closed position, the effect of a subsequent G-force equivalent to that which might be experienced by a wearer of the said helmet on being ejected from an aircraft by an ejection seat being to cause operation through the second stage of the said mechanism, the said lever pivoting so that the line of action of the said spring means is transferred from one side to the other side of the said lever pivot point with the result that the said lever becomes biased into a position which results in operation of the said locking means to lock the said visor in the lower closed position.

References Cited

UNITED STATES PATENTS

3,128,469	4/1964	Lobelle	2—6
3,239,843	3/1966	Lobelle	2—6

FOREIGN PATENTS

951,817	3/1964	Great Britain.
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