

## MOTORIZED TURNTABLE FOR TURRET ADDITIONAL ELEMENTS

The present invention relates to turrets equipped with a lethal or non-lethal weapon (firearm, water canon, etc) able to turn about two rotation axes. The turret is also equipped with aiming means that may be optical or optronic. The assembly may be remote-controlled. The turrets are most often placed on mobile elements such as vehicles and must withstand jolts caused by irregularities of the terrain.

This type of turret is used in dangerous areas such as battlefields, which are very severe environments. It must remain functional whatever the weather, in very wide ranges of temperature, in very severe electrical and electromagnetic environments. Moreover, it must be capable of resisting intense pyrotechnic shocks (for example: firing of smoke generators to improve camouflage) and also impacts linked to ballistic threats (projectiles stopped by the armour). It is therefore sometimes necessary to provide additional equipment such as, for example, protection against battlefield threats, camouflage or additional munitions payloads.

Also, these turrets equip military systems that have very long service lives (between 15 and 30 years). Accordingly, the technical solutions adopted must match up to this and be rated so as to be particularly durable.

However, these additional elements must turn with the turret and are driven by the motors thereof. These elements often have a high weight and a high inertia which necessitates rating the motors of the turret with sufficient power. For reasons of standardization, the manufacturers must therefore from the outset provide powerful motors, which are therefore heavier, without this power actually being used. The mechanical structure is then overspecified and likewise the actuators and power electronics.

The object of the present invention is to propose a standard turret that is rated exactly as required at the same time as enabling the addition of additional elements of high weight and high inertia.

The turret in accordance with the invention has two rotation axes, a vertical axis and a horizontal axis; it includes a weapon, aiming means and two motors, one part of the turret rotating about the vertical axis by a first motor and the weapon and the aiming means being turned about the horizontal axis by a second motor; it is characterized in that an additional element is turned coaxially about the vertical axis and is provided with a third motor of its own. This third motor enables rotation of the additional element about the vertical axis. The turret is thus equipped with two motors rated on the one hand to turn the mobile part of the turret about the vertical axis and on the other hand to turn the weapon and the aiming means about the horizontal axis. The turret is therefore rated optimally; the additional element has a dedicated motor that is also rated optimally and can be of different powers depending on the specific characteristics of this element (weight, inertia, etc.).

In accordance with one particular feature, the weapon overhangs relative to the vertical axis of the turret. This position is particularly advantageous because the field of action of the weapon is not impeded by the structure of the turret, a greater range of angular movement is available, and integration of the weapon and its accessories is easier.

In accordance with another feature, the additional element is a shielding. By its nature shielding is very heavy and necessitates a relatively powerful motor to be able to track the movement of the turret to which it is slaved.

In accordance with one particular feature, the additional element is a munitions payload.

In accordance with another feature, the additional element is a camouflage device. This device may contain smoke generators, for example.

In accordance with one particular feature, at least one motor is remote-controlled. This enables the user to control the turret from a protected area.

In accordance with one particular feature, the movement of the first and third motors is synchronized. This enables the additional element to turn in phase with the turret, the third motor being slaved to the first motor.

In one variant, the turret includes a grenade launcher.

5 In a first variant, the aiming means are optical.

In a second variant, the aiming means are optronic.

Other advantages will become apparent to the person skilled in the art on reading the following examples, illustrated by the appended figures, which are provided by way of illustration.

10 – Figure 1 represents an exploded perspective view of a turret with its turntable.

– Figure 2 represents a perspective view of the turret in accordance with the invention with an additional element.

15 – Figure 3 represents a section of the base of the turret with the additional element.

The turret 1 shown in Figure 1 includes a weapon 2 and aiming means 3. The turret 1 has two rotation axes, a vertical axis A and a horizontal axis B. The turret 1 is in two parts: a mobile part 10 and a fixed part 11. The axis A is the axis about which the mobile part 10 of the turret 1 turns; the axis B is the axis about which the weapon 2 and the aiming means 3 turn.

20 The part 10 of the turret 1 is actuated by a first motor (not represented) that may be disposed in the fixed part 11 of the turret 1 or in the mobile part 10. The disadvantage of disposing the first motor in the mobile part is that this increases the weight of the mobile part 10. However, this has the advantage of reducing the area to be protected from electrical or electronic jamming to the mobile part 10 instead of being obliged to protect the whole of the turret 1.

25 The weapon 2 comprises a canon 20 that has a greater or lesser length. Said weapon 2 overhangs relative to the axis A, which enables

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greater movement of the canon 20, which can thus be inclined without being impeded by the fixed part 11 of the turret 1.

The weapon 2 and the aiming means 3 are turned together by a second motor (not represented) in order to enable aiming and pointing of the weapon.

The turret 1 is fixed to a turntable 4 via the fixed part 11. The turntable 4 is circular and its rotation axis is the axis A.

The turntable 4 is shown in detail in Figure 3; it includes a fixed ring 40 and a mobile ring 41. The fixed ring 40 is fastened to the fixed part 11 of the turret 1. The mobile ring 41 is fastened to an actuator 5 and an additional element 6. The actuator 5 is a third motor slaved to the mobile part 10 of the turret 1 in order to turn the mobile ring 41, the actuator 5, the additional element 6 and the mobile part 10 together about the vertical axis, preferably means of a toothed arrangement. The actuator 5 is rated as a function of the additional element 6. It is also possible to use a standard actuator capable of orienting different additional elements 6.

The additional element 6 shown in Figure 2 is a camouflage device.

The actuator 5 is electrically connected to the mobile part 10 of the turret 1; the movement of the actuator 5 with the mobile part 10 limits the length of the connecting wire (not represented) and thus prevents said wires tangling around the fixed part 11 of the turret 1.

The connection of the mobile ring 41 to the fixed ring 40 may be effected by means of a rolling bearing.

It is of course possible to place a plurality of different additional elements on the mobile ring 41.

## CLAIMS

1. Turret (1) with two rotation axes, a vertical axis (A) and a horizontal axis (B), comprising a weapon (2), aiming means (3) and two motors, one part (10) of the turret (1) rotating about the vertical axis (A) by a first motor and the weapon (2) and the aiming means (3) rotating about the horizontal axis (B) by a second motor, characterized in that an additional element (6) is turned coaxially about the vertical axis (A) by a third motor.
2. Turret (1) according to Claim 1 characterized in that the weapon (2) overhangs relative to the vertical axis (A) of the turret (1).
3. Turret (1) according to one of the preceding claims characterized in that the additional element (6) is a shielding.
4. Turret (1) according to any one of the preceding claims characterized in that the additional element (6) is a munitions payload.
5. Turret (1) according to any one of the preceding claims characterized in that the additional element (6) is a camouflage device.
6. Turret (1) according to any one of the preceding claims characterized in that at least one motor is remote controlled.
7. Turret (1) according to any one of the preceding claims characterized in that movement of the first and third motors is synchronized.
8. Turret (1) according to any one of the preceding claims characterized in that it includes a grenade launcher.

9. Turret (1) according to any one of the preceding claims characterized in that the aiming means (3) are optical.

10. Turret (1) according to any one of Claims 1 to 8 characterized in that the aiming means (3) are optronic.