

CANNON TURRET COMPRISING AT LEAST ONE AMMUNITION MAGAZINE, AND
AMMUNITION CONTAINER FOR SUPPLYING A MAGAZINE OF SAID TYPE

5 The technical field of the invention is that of cannon
turrets, and more particularly devices for supplying
ammunition that are secured to such turrets.

Traditionally, a cannon turret comprises a gun mount
bearing a cradle that receives a weapon.

10 The cradle pivots relative to the gun mount to allow site
pointing. To that end, the cradle includes trunnions that are
mounted pivoting in sockets secured to the gun mount.

The gun mount in turn will most often be mounted pivoting
relative to a base secured to a vehicle or a structure. Such
an arrangement allows directional angle aiming of the weapon.

15 The ammunition feeding device includes at least one
ammunition magazine on the one hand, and at least one
ammunition feeding device bringing the ammunition from the
magazine toward the weapon on the other hand.

20 Patent US 5,299,487 describes such a turret that has the
particularity of having four tubes and that therefore includes
four ammunition magazines, each magazine being dedicated to a
weapon tube.

25 This turret has a compact structure, the magazines are
arranged laterally with respect to the cradle and are located
substantially below the sockets that receive the trunnions.

This known turret, however, has the drawback of not
allowing a simple resupply of the magazines with ammunition.
In particular, the magazines located furthest in front of the
turret cannot be supplied under protection from those serving
30 them.

It is the aim of the invention to propose a turret whose
architecture makes it possible to facilitate the resupply with
ammunition quickly and in a protected manner.

The invention thus relates to a cannon turret comprising a gun mount supporting a cradle that accommodates a weapon, the cradle including trunnions pivotally mounted in sockets of the gun mount, the turret including an ammunition feeding device
5 that on the one hand includes at least one ammunition magazine located laterally on the cradle, below one of the sockets accommodating a trunnion, and on the other hand at least one feeding canal for conducting the ammunition from the magazine to the weapon, the turret being characterized in that the
10 magazine includes at least one external canister that is secured to the gun mount and inside which at least one ammunition container can be accommodated, the canister having a rear end with an opening, and a closed front end, locking means being provided for blocking the container in relation to
15 the canister.

According to one embodiment, the canister may include an upper lid able to be opened and able to provide access to the upper part of at least one container and making it possible to insert or remove said container.

20 According to one embodiment, the canister may include a door arranged at its rear part, the door closing the opening arranged at the rear end of the canister and making it possible to introduce at least one container into the canister.

25 The means for locking at least one container relative to the canister may comprise, on the one hand, spacers passing through the canister and connecting two walls of the canister, and on the other hand the upper lid closing the canister.

The means for locking at least one container relative to
30 the canister may comprise the rear door.

According to one embodiment, the turret may include at least one plate arranged behind the canister and making it

possible to accommodate a container before it is introduced into the canister.

The container may advantageously be secured to the plate.

5 According to other features, the canister may be secured to a framework secured to a base plate, the framework including lateral bars arranged on either side of the canister and also carrying a socket intended to receive a trunnion.

10 The cannon turret may include two canisters secured to the framework, and arranged symmetrically on either side of a median plane perpendicular to the axis of the sockets.

15 The invention also relates to an ammunition container intended to equip such a cannon turret, the container being substantially parallelepiped and comprising two front walls parallel to one another and two side walls parallel to one another and perpendicular to the front walls, the front walls both having a height smaller than that of the side walls to allow the ammunition to come out in strips.

The container may include at least one roller positioned at a front wall.

20 The roller may be supported by a pivoting loop articulated on the side walls and forming a handle for removal and transport of the container.

25 The container may include a recess at the lower part of a front wall, the recess being delimited in front by a nose secured to the lower face.

The invention will be better understood upon reading the following description of one particular embodiment, the description being done in reference to the appended drawings and in which:

- 30
- Figure 1a is a front and perspective overview of a turret according to one embodiment of the invention;
 - Figure 1b is an rear perspective overview of a turret according to one embodiment of the invention;

- Figure 1c is an rear perspective view of the turret according to one embodiment of the invention;
- Figures 2a, 2b, 2c and 2d are several partial views showing the internal structure of the turret before mounting the cradle;
- Figure 3a is a perspective three-quarters view of the gun mount supporting the magazines;
- Figure 3b is a view similar to figure 3a and showing the containers partially removed from the right canister;
- Figures 4a and 4b are two front perspective views of an ammunition container without a lid, figure 4a showing the container empty and figure 4b showing the container filled with ammunition;
- Figure 4c is a detailed sectional view of the front bottom part of the container;
- Figure 4d is a side transparent view of the right magazine showing the ammunition strip;
- Figure 5 is a view similar to figure 4d, but in which the magazine is secured to the turret;
- Figure 6 is a partial sectional view of the top of a canister;
- Figure 7 is an enlarged view of a door closing the rear opening of a canister.

In reference to Figures 1a to 1c, a cannon turret 1 according to the invention comprises a gun mount 2 supporting a cradle 3 accommodating a weapon 4.

The cradle 3 includes trunnions (not shown) that are mounted pivoting in sockets 5 of the gun mount 2.

This turret 1 includes an ammunition feeding device that here includes two ammunition magazines, a right magazine 6a and a left magazine 6b.

The magazines 6a and 6b are arranged laterally with respect to the cradle and each below one of the sockets 5 receiving a trunnion.

5 The ammunition feeding device also includes two feeding canals 7a and 7b, which each conduct the ammunition from one of the magazines toward the weapon 4.

10 A right canal 7a conducts the ammunition coming from the right magazine 6a. A left canal 7b conducts the ammunition coming from the left magazine 6b. A rear cap 38 covers the canals 7a and 7b. This cap is only shown in Figure 1a.

15 The weapon 4 here is a so-called medium-caliber weapon (caliber below 60 mm and above 12.7 mm). This weapon is defined so as to be able to fire two different types of ammunition, for example explosive ammunition and armor-piercing ammunition. The mechanics of the weapon include means for introducing ammunition making it possible to supply the weapon, as chosen, with one or the other type of ammunition. Such a weapon is for example known from patent EP 129,457

20 It is not the subject matter of the invention and it is therefore not necessary to describe it in detail. The invention could be carried out with a weapon including two tubes, each tube being supplied with ammunition from a separate magazine.

25 Each magazine 6a or 6b includes an external canister 8a or 8b that is secured to the gun mount 2 and inside which at least one ammunition container 10 may be placed (see Figure 1b).

30 Each canister 8a, 8b includes a rear end that includes an opening (9a and 9b, respectively) and a closed front and (23a and 23b, respectively).

Locking means are provided that make it possible to immobilize each container 10 relative to its canister 8a or 8b. These locking means are described hereinafter.

Figures 2a to 2d make it possible to better understand the architecture of the turret according to the invention, Figure 2a showing a first step in producing the gun mount 2 and Figures 2b and 2c showing successive steps making it possible to produce the complete gun mount 2 as shown in Figure 2d.

In figure 2a, the gun mount is formed by a framework 11 secured to a base plate 12. The framework 11 is made up of a mechanically welded assembly of bars 33 that form the fork of the gun mount 2, this assembly supporting the two sockets 5 intended to receive the trunnions of the cradle.

Figure 2a shows that the side bars 33 are laterally assembled on either side of a space intended to receive the cradle of the weapon. These bars thus form two parallel vertical panels 13a and 13b, making up the fork, and each socket 5 extends perpendicular to each panel 13a, 13b toward the outside of the framework 11. The sockets 5 are supported toward the outside of the framework 11 by other lateral bars 33 that form support triangles 14a, 14b that extend, parallel to the panels 13a and 13b, from the socket 5 toward the base plate 12.

The panels 13a and 13b are also connected by spacers 15 that make it possible to stiffen the framework.

This base structure of the gun mount 2 makes it possible to design a gun mount that is both light and strong. The sockets 5 participate in stiffening the assembly and extend on either side of the fork. Between each socket 5 and the base plate 12, a space extends intended to accommodate the canister of a magazine.

As shown in Figure 2b, shielding plates 15a and 15b are attached to the framework 11 between the panels 13a and 13b of the fork.

Figure 2c shows the placement of the canisters 8a and 8b between each trunnion 5 and the base plate 12. It will be

noted that each canister is also made in the form of a mechanically welded structure that is attached by screwing to the base plate 12. Each canister thus contributes, with a reduced mass, to stiffening the gun mount 2 by laterally reinforcing each panel 13a or 13b. The side walls of each canister are connected by spacers 16 that contribute to the stiffness of the canister and that also make it possible to separate and maintain the ammunition containers that will be arranged in the canister (see also Figure 1c).

Figure 2c shows an upper lid 17 that is attached to the canister 8a at a lateral articulation 18 that makes it possible to provide access to the upper part of at least one container once it is placed in the canister 8a. Here, the lid 17 provides access to the three containers that are arranged at the front of the canister 8a. The right canister 8a contains a total of five ammunition containers; three containers are introduced into the canister 8a through the upper opening of the canister 8a, after releasing the lid 17, and the other two containers are introduced into the canister 8a through the rear opening 9a, as will be described later.

The other canister 8b does not have a lid. Indeed, this canister is smaller and contains only two containers 10 that are introduced into the canister 8b through the rear opening 9b. The front part of this left canister 8b can receive the electronic control units of the weapon or the turret. They will be accessible through a side door 30 (Figure 1b).

Figure 2d shows the gun mount 2 after attachment of the shielding plates 31 on the side walls of the canisters 8a and 8b. These plates 31 complete the structure of the canisters 8a, 8b and protect the ammunition magazines from ballistic impacts. In Figure 1c, the plates 31 are not attached to the framework 11.

Thus, at the end of the assembly, the gun mount 2 of the turret includes two canisters 8a and 8b that are secured to the framework 11, and that are arranged symmetrically on either side of a median plane P (Figure 2d) perpendicular to the axis 32 of the sockets 5 receiving the trunnions (therefore also relative to the axis 32 of the trunnions).

These canisters 8a, 8b have a substantial ammunition capacity, they are shielded and they protect the ammunition. They also protect an operator implementing the weapon manually or reloading magazines from behind, as will be described hereinafter.

The framework 11 of the turret according to the invention also makes it possible to define a turret whereof the length of the canisters 8a, 8b is different, without changing the framework. Indeed, as shown in Figures 2a to 2d, the canisters 8a and 8b can have different lengths to receive more or fewer containers 10. The framework 11 therefore makes it possible to give a certain configurability to the architecture of the turret.

Figures 4a and 4b show a perspective view of a container 10 intended to be positioned in one of the canisters 8a or 8b.

This container 10 is substantially parallelepiped and comprises two front walls 19a and 19b that are parallel to one another. The container 10 also includes two side walls 20a and 20b that are parallel to one another and that are also perpendicular to the front walls 19a and 19b.

As shown in Figures 4a and 4b, the front walls 19a and 19b both have a height lower than that of the side walls 20a and 20b. Such an arrangement allows the strip 21 of ammunition 22 to leave the container 10 above the front walls 19a and 19b, while the strip 21 is still held transversely by the side walls 20a and 20b.

It is thus possible to connect different containers 10 to one another by connecting the different strips 21 that are contained in each container to one another. Figure 4d thus schematically shows five containers 10₁, 10₂, 10₃, 10₄ and 10₅ positioned next to one another in a canister 8a, and the strips 21 of which are connected to one another, making it possible to feed the weapon without colliding. Closing the lid 17 of the canister 8a does not hinder the progression of the strip 21 from one container to the other and up to the weapon. Owing to the access to the internal volume of the canister given by the lid 17, it is possible, owing to the invention, to connect the strip 21 of one container to the other by jumping over one or several containers. Conversely, it is also possible to perform a partial replenishment of a container 10, directly from the upper part of the containers, without removing a container. This is more particularly interesting when a container is destroyed. It is then possible to connect the ammunition strip of one container to the following one while avoiding the destroyed container. It is also possible to replace the destroyed container with a new container and connect the latter to the ammunition strip, upstream and downstream from said new container.

As can also be seen in Figures 4a and 4b, the container 10 includes a roller 25 that is positioned at a front wall 19a or 19b. This roller 25 is supported by a pivoting loop 42 including two arms 26 that are articulated on the side walls 20a and 20b. The loop 42 formed by the roller 25 and the arms 26 thus forms a handle making it possible to remove the container 10 from the canister 8a and to transport the container 10. When the loop is folded down, as shown in Figure 4a, the axis 27 of the roller bears against an indentation 24 of each side wall 20a, 20b and the roller 25 can rotate freely on its axis 27. It is possible to provide for an assembly of

the roller 25 on a needle bearing to facilitate this pivoting. The roller 25 makes it possible to guide the strip 21 between a container and its neighbor while reducing friction. Thus, as shown in Figures 4d and 5, the strip slides without roughness from one container 10 to the other.

The container 10 also includes a recess 34 at the lower part of a front wall 19a.

This recess 34 is more clearly visible in Figure 4c. It is delimited in front by a nose 35 secured to the lower face. This nose 35 makes it possible to facilitate the manual removal of a container through the rear opening 9a or 9b.

As shown in Figures 1b and 1c, each canister 8a and 8b includes a door 28 that is arranged at its rear part. The door 28 closes the opening 9a or 9b that the canister 8a or 8b includes at its rear end.

Furthermore, the turret includes at least one plate 29 that is arranged behind the canister 8a or 8b. This plate 29 makes it possible to receive a container 10 before it is inserted into the canister 8a or 8b. This plate 29 is more particularly visible in Figures 1c and 7.

Thus, the configuration of the turret according to the invention makes it possible to receive a relatively large number of ammunition containers with a light and compact architecture.

As shown in Figures 3b and 4d, the right container 8a can receive five containers 10. Three containers are inserted into the canister 8a through its upper opening, after pivoting the lid 17. The operator can easily connect the strips to one another to conduct the ammunition strip 21 toward a feeding star wheel (not shown) of the weapon, the star being located near the socket 5 and guiding the strip toward the canals 7a and 7b (visible in Figure 1b).

The containers 10₁, 10₂ and 10₃ are held relative to the canister 8a by a locking means that comprises, on the one hand, the spacers 16 that pass through the canister 8a and connect its two side walls, and on the other hand, the upper lid 17 closing the canister 8a.

As shown more particularly in Figure 6, the lid 17 thus includes rims 17a and 17b that block the upper edges of the side walls 20a, 20b of each container. Figure 6 is a partial view that shows, in cross-section, the upper part of the right canister 8a. The sectional view is done at a roller 25 of a container 10. This figure therefore shows that the lid 17 has a U-shaped section and includes front 17a and rear 17b rims that bear against the upper edges of the side walls 20a and 20b of the body 10. Owing to these front 17a and rear 17b rims, the lid 17 thus provides immobilization of the containers 10 along a vertical direction. Figure 6 also shows the hinge 18 of the lid 17.

The lid 17 is blocked in the closed position by knuckles 40. There are two locking knuckles 40 that are also visible in Figure 3b. The lid 17 bears a handle 39 allowing it to be opened and which is only shown in Figure 1c. Figure 6 shows that the lid 17 delimits an internal volume 41 above the containers 10. This volume makes it possible to move the ammunition strip 21 without bother, from a container to its neighbor, and to the feed canals 7a or 7b of the weapon.

The rear opening 9a of the container 8a makes it possible to insert two other containers 10₄ and 10₅ into the canister 8a. These containers are placed by an operator located behind the turret and who is therefore protected by the shields 15a, 15b, 31 of the latter.

As shown in Figure 5, the strips 21 of ammunition 22 that are in each container 10 are connected to one another. The connections are made after placement of the containers 10 in

the canister in question. Regarding the right canister 8a, the strips are connected through the upper opening of the canister 8a before closing the lid 17.

After placing the various containers 10, there is therefore operationally a single strip of ammunition 21 that connects all of the containers 10. When one wishes to resupply the magazine 6a, it is possible to remove one or several containers 10 from the canister 8a after having opened the lid 17.

If the resupply must be done under fire from the enemy, it is possible to open the rear door 28 to access the two containers 10₄ and 10₅, which can be removed through the rear of the canister 8a. Such a reloading operation will be done before the entire strip 21 has been consumed. It is then easy to recover, through the rear opening 9a, the end of the strip 21 to reattach it to the strip of ammunition contained in the new containers.

The rear containers 10₄ and 10₅ are immobilized axially by the bearing of the container 10₄ on the container 10₃ and the bearing of the door 28 on the container 10₅, this door thus forming part of the locking means of said containers.

Furthermore, the door 28 (see Figure 7) will include one or two bolts 36, for example bolts each including a rod 36a pushed by a spring 36b and which engages in a collar 37 (or a piercing) carried by a wall of the canister 8a or 8b. The containers 10₄ and 10₅ are immobilized transversely by the side walls of the canister 8a or 8b.

They are lastly immobilized vertically using two guide rails 34 (see Figure 7) that are secured to each of the side walls of the canister 8a or 8b. These rails 34 form a guide means for the upper edges of the side walls 20a and 20b of the container 10 when it is inserted through the rear opening 9a or 9b.

The left canister 8b only contains two containers, and it is therefore always fed through the rear opening 9b closed by a door.

5 As an additional feed, it is possible to provide a sixth container (not shown, but denoted 10₆) for the canister 8a (or a third container for the canister 8b), this additional container remaining positioned on the rear plate 29 and being able to be capped by a protective lid (not shown).

10 The door 28 then remains open and a means will be provided for locking said additional container relative to the plate, for example a knuckle engaging in the nose 35 of the lower part of the container 10₆.

Various alternatives are possible without going beyond the scope of the invention.

15 It is for example possible to define a turret in which the two canisters 8a and 8b each include a lid and a certain number of containers that can be placed through the upper opening of the canister. Other containers also being placed through the rear opening.

20 It is also possible to design a lighter turret in which each canister 8a and 8b only includes a rear opening. The containers are then always placed through the rear of the turret. This embodiment comprises only a limited number of containers, at most three per canister.

25 In the turret according to the invention, the sockets 5 receiving the trunnions of the weapon extend above the canisters 8a and 8b receiving the ammunition. The trunnions may advantageously extend up to the outer end of the sockets and it is possible to attach a member (for example, a sighting means) to the end of the trunnions. The sighting means will
30 then follow the pointing movements of the weapon. It will be advantageous to provide a removable attachment device for said

sighting means, for example a cannulated shaft held by a screwed nut.

CLAIMS

1- A cannon turret (1) comprising a gun mount supporting a cradle that accommodates a weapon (4), the cradle including
5 trunnions pivotally mounted in sockets (5) of the gun mount, the turret including an ammunition feeding device that on the one hand includes at least one ammunition magazine (6a, 6b) located laterally on the cradle, below one of the sockets (5) accommodating a trunnion, and on the other hand at least one
10 feeding canal (7a, 7b) for conducting the ammunition from the magazine to the weapon, the turret being **characterized in that** the magazine includes at least one external canister (8a, 8b) that is secured to the gun mount and inside which at least one ammunition container (10) can be accommodated, the canister
15 having a rear end with an opening (9a, 9b), and a closed front end (23a, 23b), locking means being provided for blocking the container (10) in relation to the canister (8a, 8b).

2- The cannon turret according to claim 1, characterized in that the canister (8a, 8b) includes an upper lid (17) able to
20 be opened and able to provide access to the upper part of at least one container (10) and making it possible to insert or remove said container.

3- The cannon turret according to one of claims 1 or 2, characterized in that the canister (8a, 8b) includes a door
25 (28) arranged at its rear part, the door closing the opening (9a, 9b) arranged at the rear end of the canister and making it possible to introduce at least one container (10) into the canister.

4- The cannon turret according to claim 2, characterized in
30 that the means for locking at least one container (10) relative to the canister (8a, 8b) comprises, on the one hand, spacers (16) passing through the canister and connecting two

walls of the canister (8a, 8b), and on the other hand the upper lid (17) closing the canister.

5- The cannon turret according to claim 3, characterized in that the means for locking at least one container relative to the canister comprise the rear door (28).

6- The cannon turret according to one of claims 1 to 5, characterized in that it includes at least one plate (29) arranged behind the canister (8a, 8b) and making it possible to accommodate a container (10) before it is introduced into the canister.

7- The cannon turret according to claim 6, characterized in that the container (10) can be secured to the plate (29).

8- The cannon turret according to one of claims 1 to 7, characterized in that the canister (8a, 8b) is secured to a framework (11) secured to a base plate (12), the framework including lateral bars (33) arranged on either side of the canister (8a, 8b) and also carrying a socket (5) intended to receive a trunnion.

9- The cannon turret according to claim 8, characterized in that it includes two canisters (8a, 8b) secured to the framework (11), and arranged symmetrically on either side of a median plane (P) perpendicular to the axis (32) of the sockets.

10- An ammunition container (10) intended to equip a cannon turret (1) according to one of the preceding claims, the container being substantially parallelepiped and comprising two front walls (19a, 19b) parallel to one another and two side walls (20a, 20b) parallel to one another and perpendicular to the front walls (19a, 19b), the front walls (19a, 19b) both having a height smaller than that of the side walls (20a, 20b) to allow the ammunition to come out in strips.

11- The ammunition container according to claim 10, characterized in that it includes at least one roller (25) positioned at a front wall (19a, 19b).

5 12- The ammunition container according to claim 11, characterized in that the roller (25) is supported by a pivoting loop (42) articulated on the side walls (20a, 20b) and forming a handle for removal and transport of the container (10).

10 13- The ammunition container according to one of claims 10 to 12, characterized in that it includes a recess (34) at the lower part of a front wall (19a, 19b), the recess being delimited in front by a nose (35) secured to the lower face.