March 22, 1966 H. WEY 3,241,446

ARMOUR CUPOLA

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Fig. 1

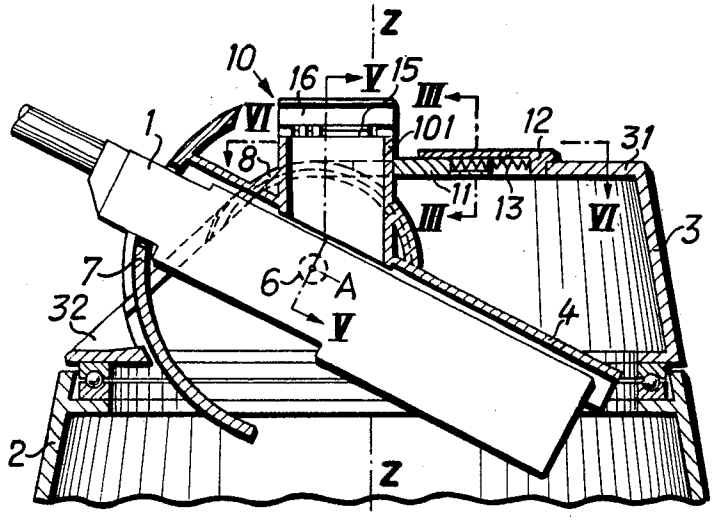

Fig. 2

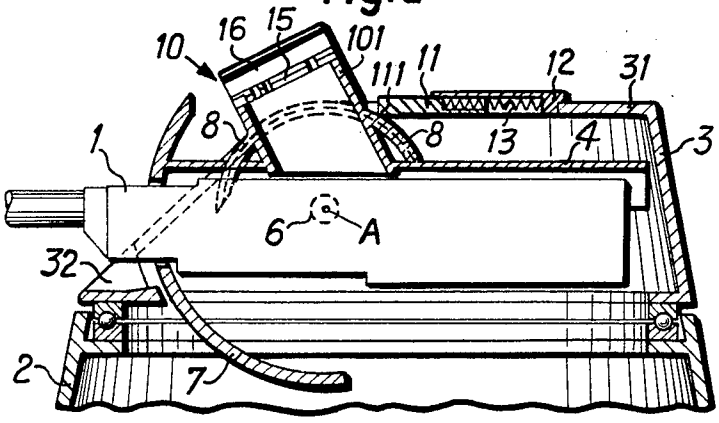

Fig. 3

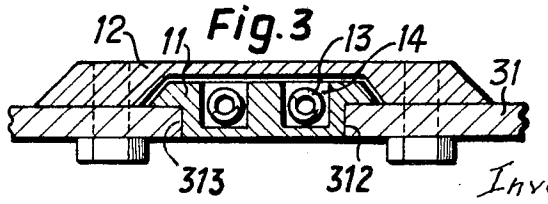

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Fig. 4

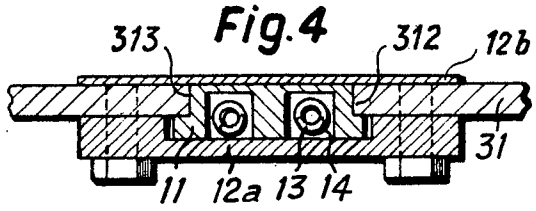


Fig. 5

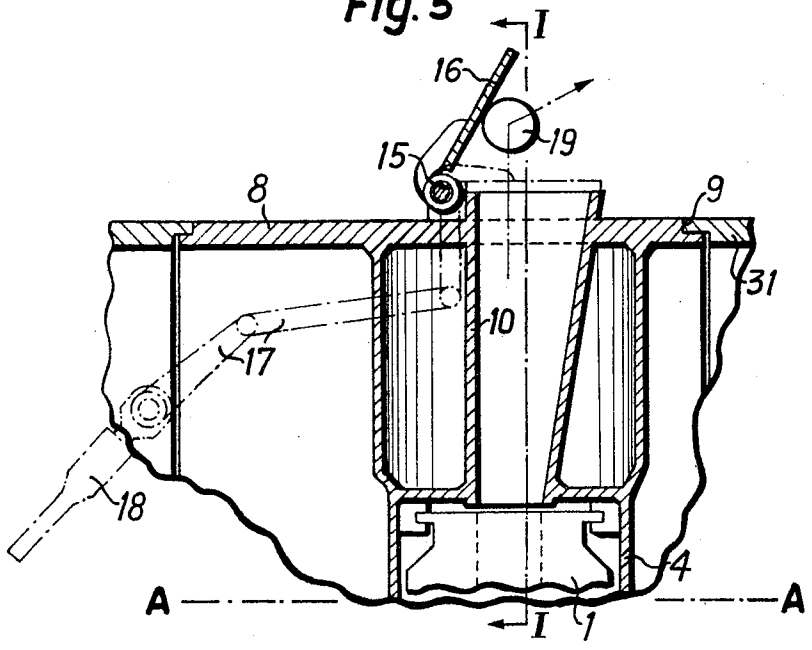
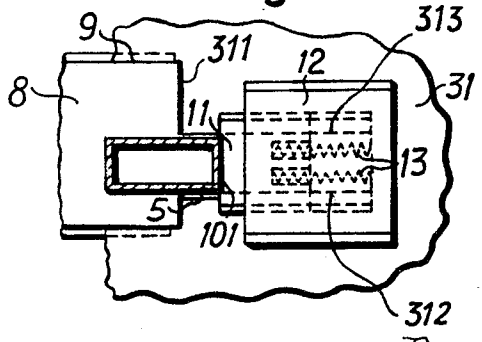


Fig. 6



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ARMOUR CUPOLA

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4 Claims. (Cl. 89—36)

The invention relates to an armour cupola having a drum shield mounted rotatably about a horizontal axis and an ejector shaft for the cartridge cases connected therewith, behind which a cut-out is provided in the ceiling of the cupola with a closure slide capable of closing said cut-out.

In a known armour cupola of this type a plate is pivotally attached to the drum shield behind the shaft, and, for equilibrium, is slidably mounted in a second plate, the end of which is pivotally attached to the ceiling of the armour cupola. When the barrel of the weapon is positioned horizontally, both plates lie at the level of the ceiling and form part of it. When elevating the barrel, however, the plates are swung into the interior of the armour cupola about the pivot point of the second plate, the plate pivotally attached to the armour cupola being shifted relative to the other plate. Thereby a wedge shaped rough is formed extending downward from the top of the cupola's ceiling, into which the empty cartridge cases ejected through the shaft drop back, where they may hamper or even prevent the movement of the plate and hence the turning of the armour shield and/or barrel.

A further disadvantageous effect is, that lateral closure jaws are to be provided, which extend into the interior of the armour cupola and seal the cupola outwardly, when the two plates sink into the interior of the cupola upon turning the cradle of the weapon. Owing to the very limited space available anyway inside the cupola, these jaws reduce the access to the weapon even further, and moreover the accumulation of the cartridge cases ejected from the shaft in the wedge-shaped trough is even more accentuated by their impinging on the side walls of the trough immediately after leaving the shaft and by their keeping lying in the trough.

A further disadvantage consists in that the cartridge cases ejected from the shaft fall back into the same, and may cause breakdowns of function of the breech of the weapon by hampering the ejection of subsequent cartridge cases.

The invention has the primary object of overcoming these disadvantages and of providing an armour cupola, which involves a considerably smaller structural expense than the known construction and which, owing to adaptability of the shape of the closure slide to the external shape of the cupola, offers the advantage, that the cartridge cases and other articles do not find any hold but slide off and are incapable of forming an accumulation. It is another object of the invention to provide increased safety thereby that the empty cartridge cases are deflected e.g. so as to fly off sideways, so that for example upon a weak ejection caused by the weapon, at low speed, they can neither fall back into the shaft nor get into the vicinity of the closure slide at all. It is yet another object of the invention to provide an armour cupola, which dispenses with structural elements protruding into the interior of the cupola, where they are in the way, take up space and are generally undesirable.

With this and other objects in view which will become apparent later from this specification and the accompanying drawings, I provide an armour cupola for a combat vehicle, comprising in combination: a cupola ceiling, a drum shield and an ejector shaft for the empty cartridge cases connected therewith mounted pivotally about a horizontal axis relative to said ceiling, wherein a cut-out is provided behind said ejector shaft, a closure slide for said ejector shaft slidably mounted and guided on said ceiling, and a spring biasing said closure slide, so that it abuts said shaft over at least part of its sliding path, which latter is limited in the advanced position of said slide by said drum shield.

Preferably this cupola comprises also a flap hinged to the top of said shaft about a horizontal axis and in the open condition assuming an inclined end position deflecting the empty cartridge cases leaving said shaft from the ejection direction predominant in said shaft.

These and other features of my said invention will be clearly understood from the following description of a preferred embodiment and detail modification thereof, given by way of example with reference to the accompanying drawings in which:

FIG. 1 is a longitudinal section through the armour cupola with the barrel elevated;

FIG. 2 corresponds to FIG. 1, but with the barrel in the horizontal position;

FIG. 3 is a section on the line III—III of FIG. 1 on a larger scale;

FIG. 4 likewise, but for a second embodiment;

FIG. 5 is a section on the line V—V of FIG. 1 on a larger scale;

FIG. 6 is a partial plan view of the cupola ceiling and of the slide in the position according to FIG. 1.

In the armour cupola **3**, which is rotatably mounted on the turret **2** of a fighting vehicle about the azimuth aiming axis Z—Z a cradle **4**, which carries the automatic firearm **1**, is mounted pivotally about the trunnions **6** forming the elevation aiming axis A—A.

A drum shield **7** is fixedly connected with the cradle **4**, and so is also a second drum shield **8**, which according to FIG. 5 is guided in the opening **9** of the ceiling **31** and in the inclined front wall **32** of the armour cupola **3**. A shaft **10** is fixed to the cradle **4** and to the shield **7**, through which shaft the empty cartridge cases coming from the weapon **1** are ejected into the open. As shown in FIG. 6, the shaft **10** extends into a cut-out denoted **5**, which is cut into the ceiling **31** of the cupola. At the left and right of the cut-out **5** the ceiling **31** extends with an inner edge **311** contacting the shield **8**. In accordance with FIGS. 1 and 3 this cut-out **5** is covered by a movable slide **11** guided between the two parallel edges **312** and **313** therein and resting on the ceiling **31**, which slide is held in its slide track by a cover **12**. By helical springs **13** arranged in one of its grooves **14** and abutting the rear wall of the cover **12**, the slide **11** is biased towards the rear wall **101** of the shaft **10** and towards the drum shield **8**, respectively.

As shown as a modification in FIG. 4, the slide **11** may however, be arranged and guided for example on the underside of the ceiling **31** of the cupola. The slide **11** is supported on the lower side and is held in its slide track by a cover **12***a*. On the exterior side of the ceiling **31** a corresponding plate **12***b* takes over the protection against the penetration of foreign bodies.

On the upper edge of a side wall of the shaft **10** projecting beyond the shield **8**, an axle **15** is mounted (see FIG. 5), on which a flap **16** is keyed. Moreover a linkage **17** is connected with the axle **15**, by means of which the flap **16** may be turned by an adjustment lever **18**.

From this construction follows the manner of operation of the arrangement described hereinabove of the armour cupola:

When putting the arrangement into readiness for combat, the gunner opens the flap **16**, which previously had

been held in the closure position, by actuating the lever **18** until a predetermined end position is reached.

With the shaft **10** thus opened, any empty cartridge cases **19** ejected through the same, impinge the flap **16**, which is directed obliquely upwards, and are deflected laterally by the same e.g. transversely of the aiming direction of the weapon, and are thrown off. Thereby the cartridge cases thrown up are prevented from falling back into shaft **10** or on the ceiling **31** of the cupola. Moreover the ejected cartridge cases are prevented from dropping in front of the barrel of the weapon, when the shaft is inclined forward, i.e. when the weapon is pointing horizontally, in which position the cartridges could get into the trajectory of their own protectiles and could be met there by a projectile leaving the barrel. By explosion of such projectile, owing to response of its fuse to the impact of an empty cartridge case, a great danger would be created.

When lowering the weapon, for example from the position illustrated in FIG. 1, to the horizontal as shown in FIG. 2, the shaft **10** moves forward in the cut-out **5** of the ceiling, until its rear wall **101** reaches the position indicated in FIG. 2.

During this movement of the shaft the slide **11** taking part in this movement owing to the bias of the springs **13** abuts the wall **101** of the shaft, whereby the cut-out **5** is kept closed, and when the weapon **1** is lowered further, the slide **11** reaches the limit of its path, abutting the drum shield **8**.

While I have herein described and illustrated in the accompanying drawings what may be considered a typical and particularly useful embodiment of my said invention and a detail modification thereof, I wish it to be understood that I do not limit myself to the particular details and dimensions described or illustrated; for obvious modifications will occur to a person skilled in the art.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a tank cupola for a combat vehicle comprising in combination a cupola roof provided with a recess having an interiorly located roof edge, the sides of said recess extending from said edge lying parallel to one another, an axis essentially parallel to said edge, a body swingable forth and back between two final positions around said axis, said body comprising a drum shield contacting said edge, an ejecting flue protruding from said shield and said cupola roof, said ejecting flue in a first of said two final positions being located outside of said recess and in a second position engaging in said recess, plate-like covering means extending along said cupola roof to cover said recess comprising a spring-loaded slide displaceable on said sides of said recess in the direction towards said edge, whereby said slide in said first position engaging said edge is resiliently urged against said drum shield and in said second mentioned position against said ejecting flue.

2. In a tank cupola as claimed in claim **1** wherein said slide has a protecting plate secured to the outside of said supola roof partially covering said slide.

3. In a tank cupola as claimed in claim **1** wherein a guiding plate is attached to the interior side of said cupola roof partially guiding said slide.

4. In a tank cupola as claimed in claim **1** wherein a flap hinged to the top of said flue about a horizontal axis and in an open condition assuming an inclined end position deflecting empty cartridge cases leaving said flue from the ejection direction predominant in said flue.

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