

DESCRIPTION**Flare with flare ignition and ejector mechanism for the
same**

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The invention relates to a flare and to the capability for improved flare ignition, in particular to novel and rapid ignition of the coated films with active
10 pyrotechnic substances for the production of a pyrotechnic signature with the aim of producing a camouflage screen etc., for the protection of vehicles and objects, for example aircraft against heat-seeking threats, for example surface-to-air rockets.

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Pyrotechnic films with a pyrotechnic coating, for example red phosphorus, are used in various cartridges, in order to spontaneously cover a surface with hot particles in order, for example, to mask out a thermal
20 image. In this case, the carrier is broken up with the aid of a central fuse charge. During break up, a flame front and a pressure front are formed, which on the one hand distribute the pyrotechnic films over an area, and on the other hand produce a flame front, igniting the
25 pyrotechnic films.

At the moment, Class 1 break-up systems are used to produce these massive pyrotechnic effects. This results in a very high classification of the active system and
30 prevents use for protection, for example, of civil aircraft, since it is forbidden to carry Class 1 substances/appliances in aircraft such as these.

The purpose for the invention in this context is to
35 specify a flare having a flare ignition which also allows use for / in civil aircraft, vehicles, objects etc.

The object is achieved by the features of patent claim 1, and further advantages are indicated in the dependent claims.

5 The invention is based on the idea of achieving the ignition contactlessly, for example by heat transfer. To this end, a specific temperature that is higher than the ignition temperature is produced and is transmitted to the films, such that they are ignited.

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This is then carried out from the interior.

The solution principle is represented by a tubular connecting stub which can be heated to the specific
15 temperature and preferably tapers conically, by means of which the films with a pyrotechnic or comparable coating which can be ignited are ignited during axial relative movement. The coated films are ignited in the tubular connecting stub and are left while burning.

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When the coated polygonal films move relatively in the heated tubular connecting stub, their corners slide along the connecting stub length and are ignited by the heat transfer produced in the corners that are in
25 contact with the tube or tubular connecting stub.

The tapering barrel is therefore one preferred embodiment to ensure ignition. The contact surface between the coated film and the (conical) tubular
30 connecting stub increases continuously during relative movement, and in consequence increases the functional reliability.

The heating of the (conical) tubular connecting stub
35 can be carried out both electrically and by a burner, etc.

The active signature starts without delay for ejection of the coated films, and enhances the effectiveness of the protection system.

- 5 The coated films preferably have a specific polygonal geometry. The functional reliability of the ignition is in this case increased in proportion to the number of corners of the coated films.
- 10 The coated films can be deployed individually and in layers in a pack, thus considerably enhancing the effectiveness of the protection system. Radial rotation of the coated film is irrelevant to the effectiveness itself.

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- The advantages of this system are not only the very high functional reliability with a low failure rate, but little maintenance effort, low costs and adequate safety for transport and when in operation. This is
- 20 achieved in that the coated films are accelerated in a separate acceleration system, which is at the same time decoupled from the heat, before the heated tube or tubular connecting stub. The coated films can be accelerated mechanically (for example by a spindle
- 25 drive), pneumatically (for example by compressed air) or else pyrotechnically.

- The system is suitable not only for protection of civil aircraft but also for protection of vehicles,
- 30 buildings, moving and/or stationary objects of any type, and of marine vessels because of the characteristics of the flares which provide visual (smoke) and infrared concealment.

- 35 The invention will be explained in more detail using one exemplary embodiment and with reference to the drawing, in which:

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Figure 1 shows a conically tapering tubular connecting stub as the basic unit for ignition,

5 Figure 2 shows a geometrically preferred illustration of a flare.

In Figure 1, 1 denotes a preferably conically tapering tubular connecting stub with a heating element of a deployment system 2 (also referred to as an ejection system) for at least one flare 10 (figure 2). The tubular connecting stub 1 has a first, front internal diameter D_{IR-2} and a second, rear internal diameter D_{IR-1} , as well as a length L . The deployment system 2
10 furthermore comprises an acceleration unit 3 and insulation 4 in order to provide thermal decoupling between the ignition unit 1 and the acceleration unit 3. The second internal diameter D_{IR-2} is in this case equal to the diameter of the insulation 4 and of the acceleration unit 3. P denotes the axial movement direction of the film and of the flare 10.
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Figure 2 shows a polygonal, coated flare 10. The number of corners E should be greater than three. The diagonal D_F between the corners E is in this case greater than
25 the rear internal diameter D_{IR-1} . The first internal diameter D_{IR-2} is itself greater than or equal to the diagonals D_F . During relative movement - in the direction P - the corners E slide in the heated tube 1 along the length L and are ignited by the heat transfer that is produced in the corners E which are in contact with the tubular connecting stub 1. Subject to the condition mentioned above, the contact area between the coated film 10 and the correspondingly conical tubular
30 connecting stub 1 increases continuously during relative movement.
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The described exemplary embodiment is one preferred embodiment. Alternatively, the heatable tubular

connecting stub may also have a constant internal diameter. Conditions can then be created which allow adequate ignition of the flare 10, which can be achieved for example by the configuration of the flare 5 10 such that it should then be considerably larger than the internal diameter of the tubular connecting stub, in order that the corners of the flare can thus also come into contact with the heatable inner wall of the tube. In order to ensure adequate ignition, the films 10 could, for example, have corners which can be bent over, via which the heat transfer then likewise takes place, when the film is accelerated along the inner wall of the tube or tubular connecting stub.

PATENT CLAIMS

1. A flare (10) for the production of a pyrotechnic
signature with the aim of producing a camouflage
screen etc., for the protection of vehicles and
objects, characterized in that the flare (10) is
polygonal and coated, with the number of corners
(E) being greater than three.
2. Flare ignition for the ejectable flare (10) as
claimed in claim 1, characterized in that
contactless igniting is carried out by heat
transfer within a type of tube or tubular
connecting stub (1) with heating elements, wherein
the tubular connecting stub (1) has a conically
tapering shape.
3. The flare ignition as claimed in claim 2,
characterized in that the tubular connecting stub
(1) can be heated electrically and by a burner.
4. An ejection system (2) having flare ignition as
claimed in claim 2 or 3, characterized by an
acceleration unit (3), which is adjacent to the
tube (1) and heat decoupling (4) which is located
between them.
5. The ejection system as claimed in claim 4,
characterized in that the diagonal (D_F) between the
corners (E) of the flare (10) is greater than the
rear internal diameter (D_{IR-1}) but is less than or
equal to the front internal diameter (D_{IR-2}) of the
tubular connecting stub (1).
6. The ejection system as claimed in one of claims 4
or 5, characterized in that the flares (10) can be
accelerated mechanically, pneumatically or
pyrotechnically.