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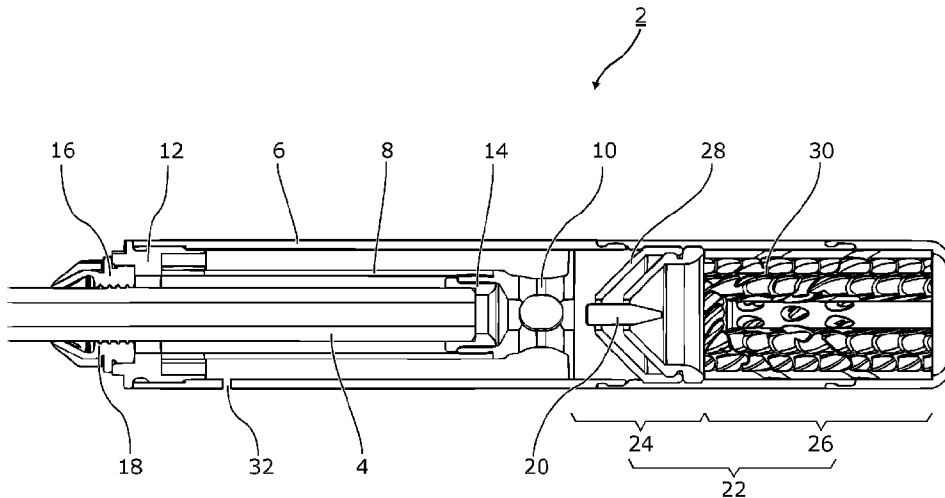
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(54) Titre : SILENCIEUX A INSTALLER SUR UN CANON DE FUSIL

(54) Title: SILENCER FOR MOUNTING ON A GUN BARREL



(57) Abrégé/Abstract:

The invention relates to a silencer (2) for mounting on a gun barrel (4), having a silencer housing (6) for at least partially completely enclosing the gun barrel (4), and a jacket pipe (8) integrated into the silencer housing (6) for enclosing the gun barrel, as well as a muzzle brake (10), with which the jacket pipe (8) is held in a centered manner in the silencer housing (6), and at least one device (22) for deflecting and/or cooling a gas produced when a shot is fired, wherein a clamping device (16) is provided for form-fitting and/or force-fitting fixing to the gun barrel (4).



Abstract

The invention relates to a silencer (2) for mounting on a gun barrel (4), having a silencer housing (6) for at least partially completely enclosing the gun barrel (4), and a jacket pipe (8) integrated into the silencer housing (6) for enclosing the gun barrel, as well as a muzzle brake (10), with which the jacket pipe (8) is held in a centered manner in the silencer housing (6), and at least one device (22) for deflecting and/or cooling a gas produced when a shot is fired, wherein a clamping device (16) is provided for form-fitting and/or force-fitting fixing to the gun barrel (4).

Description

Silencer for mounting on a gun barrel

The invention relates to a silencer for mounting on a gun barrel, having a silencer housing for at least partially completely enclosing the gun barrel.

Silencers, also called muzzle signature reducers, in the field of weaponry are a device located at the muzzle of a gun barrel to reduce sound emissions and muzzle flash. Furthermore, silencers can also reduce recoil upon firing, which, together with the mass of the silencer, reduces the high impact of the gun. Furthermore, the accuracy of long guns is increased, as silencers have a positive physical effect on the (propulsion/combustion) gases trailing the projectile. Additionally, a silencer changes the sound of the muzzle blast.

In particular, silencers reduce the volume of the muzzle blast and thus reduce the risk of hearing damage for hunters, beaters and dogs, for example. Unlike hearing protectors, silencers do not restrict three-dimensional hearing.

Such silencers are often designed as screw-on barrel attachments. In this context, the silencers have an internal thread, which can be screwed onto a corresponding external thread of a gun barrel (muzzle thread). In order to ensure the most tilt-free guidance and fastening possible, these threads are often formed with a fine thread. If, for example, dirt gets to this fine thread during a hunt, the fastening of the silencer is made more difficult or even made impossible.

The invention is based on the task of specifying a particularly suitable silencer for mounting on a gun barrel. In particular, a simple and effort-reduced assembly is to be made possible, even on gun barrels without a muzzle thread.

The task is solved according to the invention with the features of claim 1. Advantageous designs and further developments are subject of the subclaims.

5 The silencer according to the invention is provided for mounting on a gun barrel, and is suitable and configured for this purpose. The silencer is preferably designed as a barrel attachment, which can be mounted on a barrel or a muzzle of a gun, in particular a hand-held gun, preferably a hunting rifle.

10 The silencer has a silencer housing, which, in the assembled state, completely encloses the gun barrel, at least in sections. The silencer housing has an integrated jacket pipe, which preferably encloses the gun barrel in the assembled state. A muzzle brake is received in the silencer housing, which holds the jacket pipe in a centered manner in the silencer housing. In this case, the muzzle brake is provided and arranged for utilizing the energy of the combustion gases (propulsion
15 gases) produced during a firing operation in order to reduce the recoil of the gun. The silencer further has a device for deflecting and/or cooling the gases produced during firing, whereby a reduction of the muzzle blast and muzzle flash is realized.

20 According to the invention, the silencer has a clamping device for form-fitting and/or force-fitting fixing of the gun barrel. In other words, a non-destructive clamping attachment of the silencer to the gun barrel is provided, i.e. the gun barrel is clamped by the clamping device. This makes it possible to mount the silencer also on a gun barrel without a muzzle thread. Thus, a particularly suitable
25 silencer is realized.

The conjunction "and/or" here and in the following is to be understood in such a way that the characteristics linked by means of this conjunction can be formed both together and as alternatives to each another.

30 A "form fit" or a "form-fitting connection" (positive/interlocking connection) between at least two interconnected parts here and in the following is understood in particular to mean that the cohesion of the interconnected parts takes place at least in one direction by a direct interlocking of contours of the parts themselves or by an

indirect interlocking via an additional connecting part. The "blocking" of a mutual movement in this direction thus takes place due to the shape.

5 A "force fit" or "force-fitting connection" (non-positive/frictional connection) between at least two connected parts here and in the following is understood to mean in particular that the connected parts are prevented from sliding against each other due to a frictional force acting between them. If a "connecting force" causing this frictional force is missing (this means the force that presses the parts against each other, for example a screw force or the weight force itself), the force-fitting connection
10 cannot be maintained and can therefore be released.

The silencer can preferably be completely disassembled manually and can be assembled by a user without any risk.

15 In a preferred embodiment, the clamping device is designed as a collet chuck. The collet chuck has, for example, an externally conical, radially slotted sleeve with a central bore as a receptacle or feed-through opening for the gun barrel. The sleeve or respectively the bore are adapted to the respective barrel diameter of the gun barrel. The collet chuck is clamped onto the gun barrel by means of a key or
20 lever, for example. This ensures a particularly stable and reliable fastening of the silencer. In particular, a reduced effort and always centering clamping of the gun barrel is realized.

In an appropriate embodiment, the clamping device is arranged on an end face of
25 the silencer housing. In other words, the clamping device is arranged on a side of the silencer housing opposite the outlet opening. In this case, the end face is designed, for example, as a removable housing cover.

In one possible embodiment, the silencer is designed, for example, as an integral
30 silencer, wherein the silencer housing is not merely placed on the muzzle of the barrel, but extends essentially completely over the gun barrel in its longitudinal direction and encloses it at least in sections like a jacket. This optimizes a damping performance of the silencer. Due to the frontal arrangement of the clamping device

or collet chuck, a center of gravity of the silencer is shifted towards the rear, i.e. towards the gun and away from the muzzle of the gun barrel. Furthermore, the silencer thus has a particularly compact design in front of the muzzle barrel, which significantly improves the maneuverability and balance of the gun equipped with it.

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In an expedient embodiment, the end face of the silencer housing is provided with an internal thread, into which an external thread of the clamping device is screwed or can be screwed. In other words, the clamping device or the collet chucks are screwed into the end face or the housing cover. Thereby, a simple and non-destructively detachable fastening of the clamping device to the silencer housing is realized. On the one hand, this enables simple assembly and disassembly of the silencer, for example for maintenance purposes. On the other hand, it is thus possible to exchange or change the clamping device or respectively the collet chuck, so that the silencer can be adapted to a particular gun barrel in a particularly variable and flexible manner by changing the clamping device.

15

In an advantageous further embodiment, the clamping device has at least one seal on an inner circumference surrounding or enclosing the gun barrel. In the assembled state, the clamping device - and thus the silencer - is sealed, in particular gas-tight, with respect to the outer circumference of the gun barrel by means of the seal. On the one hand, the seal absorbs the forces of the gas pressure of the combustion gases and, on the other hand, the clamping or chucking action of the clamping device or respectively of the collet chuck. The seal also increases the frictional resistance and thus the force-fitting holding force on the gun barrel.

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Furthermore, the at least one seal enables the jacket pipe to be installed inside the silencer housing in a non-fixed manner, whereby a larger expansion chamber can be realized. This further improves the damping performance of the silencer.

30

An additional or further aspect of the invention provides a centering sleeve for centering the gun barrel, which is arranged on a front side of the barrel facing the muzzle brake. The silencer is thus centered relative to the barrel bore axis of the gun barrel via the centering sleeve. The gun barrel is thus held by the centering

sleeve and the clamping device at two points. As a result, a reliable and safe holding and alignment of the silencer on a threadless gun barrel is realized.

When used on a gun barrel provided with a muzzle thread, it is possible, for example, to replace or exchange the centering sleeve with a threaded insert or a threaded sleeve in order to screw the silencer onto the gun barrel or respectively onto the muzzle thread. In the case of such a screw fastening, it is conceivable, for example, that a plastic insert is introduced on the end face or respectively the housing cover of the silencer housing, which prevents scratching of the gun barrel when it is fitted.

In one conceivable embodiment, the muzzle brake is screwed to the jacket pipe. In this way, a reliable fastening and holding of the jacket pipe in the silencer housing is realized. For example, the muzzle brake is externally screwed to the jacket pipe. For this purpose the jacket pipe has an internal thread and the muzzle brake has an external thread.

In an expedient embodiment, the device has an (baffle wall) chamber with a number of baffle walls and/or a (gas rotation) chamber with a gas rotation insert. Preferably, the device has both a baffle wall chamber and a gas rotation chamber, which are arranged downstream of each other. This enables a reliable reduction of sound emissions and of the muzzle flash.

The baffle walls are designed, for example, as reflective surfaces for the combustion gases. In this way, the propulsive gases of the projectile emerging from the muzzle are slowed down and cooled, which leads to a reduction of the muzzle blast and muzzle flash. The baffle walls are each designed, for example, as a conical shell of a cone, and have, for example, an opening angle of about 45° .

The gas rotation insert has a significant influence on the attenuation performance of the silencer. Due to the (gas) rotation insert, the gases are cooled very quickly and the muzzle blast is swirled. The rotating insert preferably has a shape or geometry that realizes a particularly high damping performance in a compact design.

In a particularly preferred embodiment, the gas rotation insert is produced as an exchangeable 3D printed part. This means that the gas rotation insert is manufactured in a three-dimensional printing process, which enables a particularly effective and suitable shape and geometry with respect to the damping performance. This makes it possible to manufacture the silencer in substantially shorter designs, which provides a significant advantage for the handling of a gun equipped therewith.

Due to the interchangeability or replaceability of the gas rotation insert, it is furthermore possible to flexibly adapt the silencer to a respective caliber of the gun. For example, when changing the caliber, only the gas rotation insert needs to be replaced.

In a suitable further embodiment, an intermediate space is formed between the silencer housing and the jacket pipe as an expansion chamber, wherein the silencer housing has at least one vent hole for the intermediate space. The vent hole can in this case also be part of the device, for example. Through the vent hole, a cold air can escape from the expansion chamber, so that the hot (combustion/propulsion) gases can spread out and be cooled more quickly. This further improves the damping performance of the silencer.

Furthermore, this has the additional effect that the silencer does not heat up so quickly. This reduces flickering visible in a target optic (scope) due to rising heat.

In particular, such flickering only occurs after several shots fired in quick succession.

Furthermore, the vent hole allows moisture to escape from the jacket pipe. By the term "moisture" here and in the following it is meant in particular the presence of water, in particular in the form of water vapor from a humidity of an air enclosed in the jacket pipe. This means that an unbound water content may be present within the jacket pipe, which may chemically react with powder residues, for example,

and lead to damage or corrosion. The vent hole ensures that the moisture can escape from the jacket pipe, which improves the service life of the jacket pipe and thus of the silencer.

5 The invention is explained in more detail in the following with reference to a drawing. In said drawing, the only figure shows a silencer mounted on a gun barrel.

The figure shows a perspective sectional view of a silencer 2, which is mounted on the muzzle side of a gun barrel 4 of a gun not shown in more detail. The gun is, for
10 example, a hunting rifle. In this embodiment example, the gun barrel 4 does not have a muzzle thread. In other words, the gun barrel 4 is thus formed without a thread.

The silencer 2 is designed in particular as an integral silencer, and has a cylindrical or tubular silencer housing 6 as an outer jacket pipe, which completely en-
15 closes the gun barrel 4 in sections. The silencer housing 6 receives an (inner) jacket pipe 8, which coaxially encloses the gun barrel 4. On the one hand, the jacket pipe 8 is held in a centered manner in the silencer housing 6 by means of a muzzle brake 10. On the other hand, the jacket pipe 8 is seated in an unspecified
20 receptacle of an annular housing cover 12, which closes the silencer housing 6 at one end face.

The muzzle brake 10 engages at least in sections in the jacket pipe 8, wherein a centering sleeve 14 is arranged in the engaging region of the muzzle brake 10, by
25 means of which the gun barrel 4 is center-aligned on the muzzle side in the jacket pipe 8 or respectively in the silencer housing 6. In this case, the muzzle brake 10 is provided in the engaging region with an external thread, which is screwed into a corresponding internal thread of the jacket pipe 8.

30 The housing cover 12 has a threaded bore on the outside of the housing, into which a clamping device 16, which is designed as a collet chuck, is screwed. For this purpose, the clamping device 16 has a fastening section provided with an external thread, which is screwed into the internal thread of the threaded hole. In the

assembled state, the clamping device 16 fixes the silencer 2 in a form-fitting and/or force-fitting manner to the gun barrel 4.

The clamping device 16 has four axially distributed seals 18, which are arranged
5 as radial ring seals on one of the clamping devices 16 surrounding or enclosing the gun barrel 4. In the assembled state, the clamping device 16 - and thus the silencer 2 - is sealed, in particular gas-tight, with respect to the outer circumference of the gun barrel 4 by means of the seals 18. On the one hand, the seals 18 absorb the forces of the gas pressure of the combustion gases and, on the other
10 hand, the clamping or chucking action of the clamping device 16 or respectively of the collet chuck. The seals 18 further increase the frictional resistance and thus the force-fitting holding force on the gun barrel 4.

"Axial" or an "axial direction" here and in the following is understood to mean in
15 particular a direction parallel (coaxial) to the gun barrel 4, i.e. perpendicular to the end faces of the silencer 2. Correspondingly, "radial" or a "radial direction" here and in the following is understood in particular as a direction oriented perpendicularly (transversely) to the longitudinal axis of the gun barrel 4 along a radius of the gun barrel 4 or respectively of the silencer 2. "Tangential" or a "tangential direc-
20 tion" here and in the following is understood to mean in particular a direction along the circumference of the silencer 2 or the gun barrel 4 (circumferential direction, azimuthal direction), i.e. a direction perpendicular to the axial direction and to the radial direction.

25 The figure further shows a projectile 20 discharged from the gun barrel 4, which is shown in the region of a device 22 for deflecting and/or cooling a (propulsion/combustion) gas produced during a firing operation. In this case, the device 22 has a baffle chamber 24 and a gas rotation chamber 26, which are connected axially in succession to the muzzle brake 10.

30 The baffle chamber 24 has, for example, two baffle walls 28 arranged one behind the other. The baffle walls 28 are each configured, for example, as a conical jacket of a cone, and have, for example, an opening angle of about 45°.

A substantially hollow cylindrical gas rotation insert 30 is received in the gas rotation chamber 26.

- 5 The gas rotation insert 30 preferably has a shape or geometry that realizes a particularly high damping performance in as compact an installation space as possible. The gas rotation insert 30 is in particular manufactured as an exchangeable 3D printed part.
- 10 Between the silencer housing 6 and the jacket pipe 8, an intermediate space (annular space), which is not described in more detail, is formed as an expansion chamber. In this case, the silencer housing 6 has at least one vent hole 32, which passes approximately radially through the silencer housing 6 and thus couples the expansion chamber or respectively the intermediate space to the environment.
- 15 Through the vent hole 32, a cold air can escape from the expansion chamber, so that the hot (combustion/propulsion) gases can spread faster and be cooled down.

The silencer 2 can preferably be completely disassembled manually and can be assembled by a user without danger.

20

The invention is not limited to the embodiments described above. Rather, other variants of the invention may also be derived therefrom by the expert without leaving the object of the invention. Furthermore, in particular, all individual features described in connection with the embodiment examples can also be combined

25 with each other in other ways without leaving the object of the invention.

List of reference signs

	2	silencer
5	4	gun barrel
	6	silencer housing
	8	jacket pipe
	10	muzzle brake
	12	housing cover
10	14	centering sleeve
	16	clamping device
	18	seal
	20	projectile
	22	device
15	24	baffle chamber
	26	gas rotation chamber
	28	baffle wall
	30	gas rotation insert
	32	vent hole

20

Claims

1. Silencer (2) for mounting on a gun barrel (4), having a silencer housing (6) for
at least partially completely enclosing the gun barrel (4), and a jacket pipe (8)
5 integrated into the silencer housing (6) for enclosing the gun barrel, and also
a muzzle brake (10), with which the jacket pipe (8) is held in a centered man-
ner in the silencer housing (6), and at least one device (22) for deflecting
and/or cooling a gas produced when a shot is fired, wherein a clamping de-
vice (16) is provided for form-fitting and/or force-fitting fixing to the gun barrel
10 (4).
2. Silencer (2) according to claim 1,
characterized in
that the clamping device (16) is designed as a collet chuck.
- 15 3. Silencer (2) according to claim 1 or 2,
characterized in
that the clamping device (16) is arranged on an end face of the silencer
housing (6).
- 20 4. Silencer (2) according to claim 3,
characterized in
that the end face of the silencer housing (6) is provided with an internal
thread, into which an external thread of the clamping device (16) is screwed
25 or can be screwed.
5. Silencer (2) according to one of claims 1 to 4,
characterized in
that the clamping device (16) has, on an inner circumference surrounding the
30 gun barrel (4), at least one seal (18) for absorbing forces of a gas pressure
produced during a firing.
6. Silencer (2) according to one of claims 1 to 5,

characterized in
that a centering sleeve (14) for centering the gun barrel (4) is provided on an
end face of the jacket pipe (8) facing the muzzle brake (19).

5 7. Silencer (2) according to one of claims 1 to 6,

characterized in
that the muzzle brake (10) is screwed to the jacket pipe (8).

8. Silencer (2) according to one of claims 1 to 7,

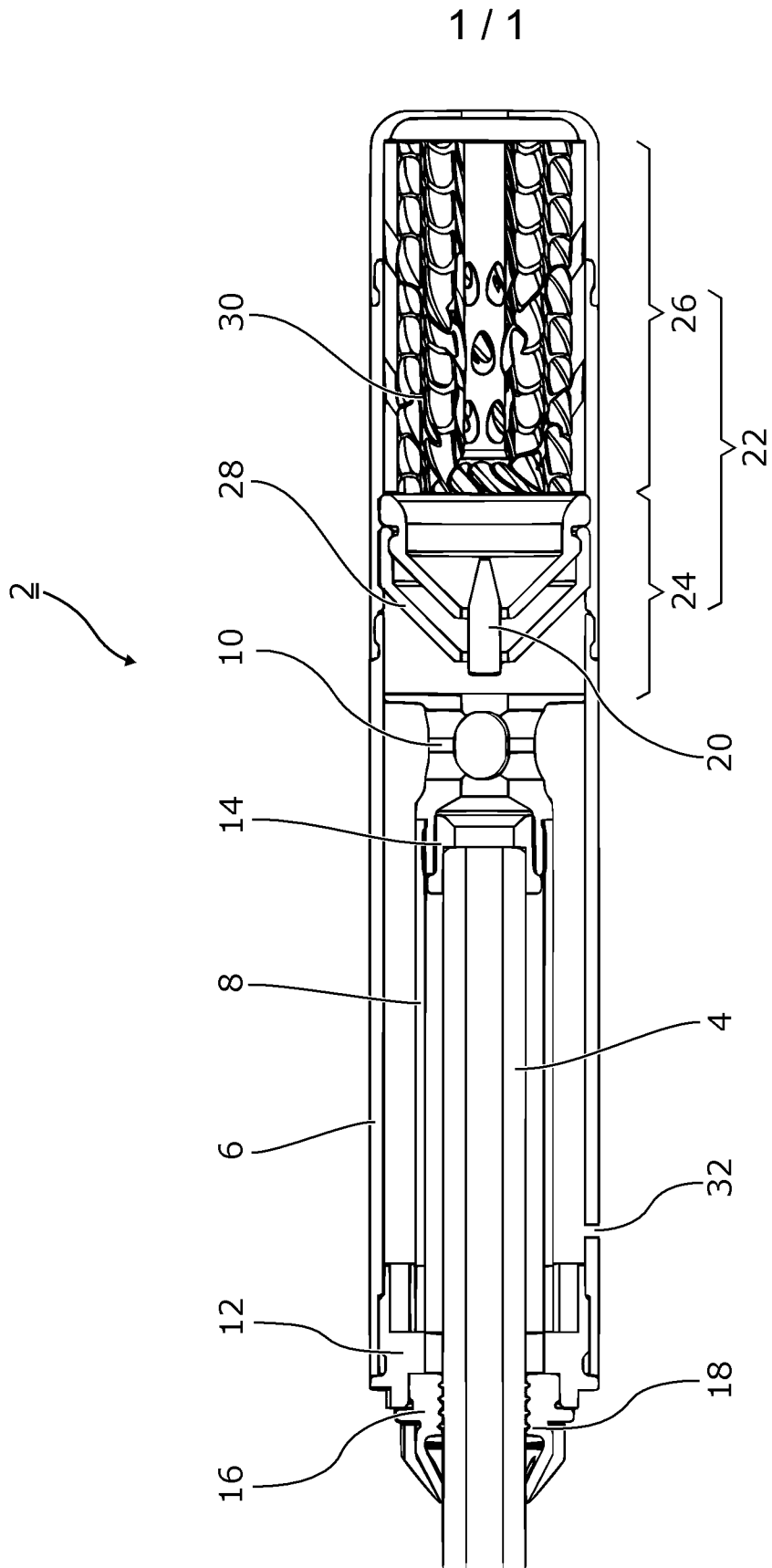
10 characterized in
that the device (22) has a chamber (24) with a number of baffle walls (28)
and/or a chamber (26) with a gas rotation insert (30).

9. Silencer (2) according to claim 8,

15 characterized in
that the gas rotation insert (30) is a replaceable 3D printed part.

10. Silencer (2) according to one of claims 1 to 9,

20 characterized in
that an intermediate space is formed between the silencer housing (6) and
the jacket pipe (8), wherein the silencer housing (6) has at least one vent
hole (32) for the intermediate space.



Figur

