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SPACING MEMBER FOR A RECOIL-FREE WEAPON

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Fig 1

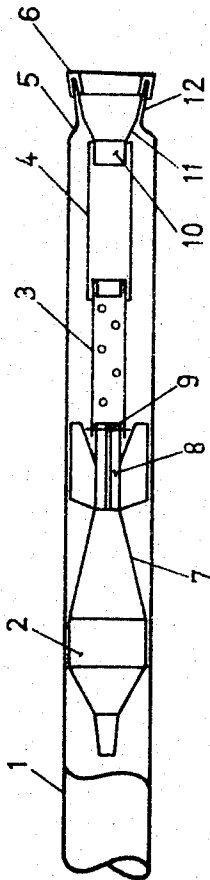
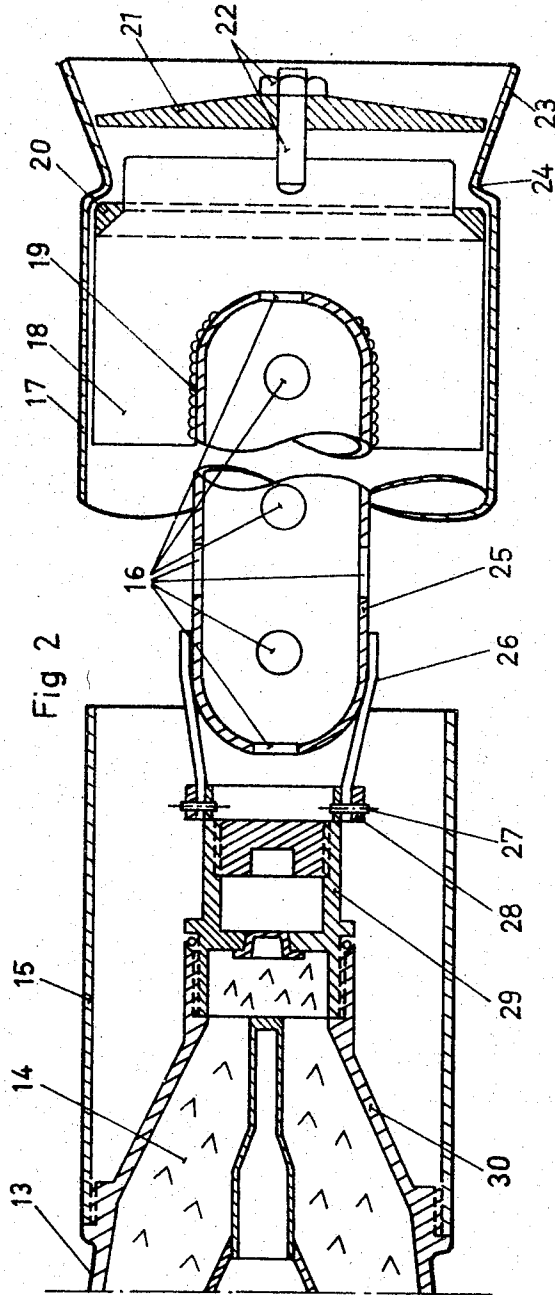


Fig 2



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**SPACING MEMBER FOR A RECOIL-FREE WEAPON**  
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## ABSTRACT OF THE DISCLOSURE

A recoilless weapon having a firing tube and a projectile and a separate gunpowder chamber located behind the projectile, said gunpowder chamber being of smaller calibre than the tube and provided with lateral openings for the combustion gases and connected to the rear end of the projectile by means of an easily interruptable connection, said gunpowder chamber being supported in the firing tube by a spacing member and so located in the firing tube that, when the weapon is fired, a gas stream is directed forwardly for launching the projectile, and a rearwardly directed gas stream from the gunpowder chamber for compensating the recoil, exert forces to the gunpowder chamber which are approximately equal and substantially neutralize each other as far as the gunpowder chamber is concerned.

For combating tanks, the recoilless weapons have manifested themselves to be particularly suitable, because they have the combined characteristics of being sufficiently efficient and of small size and light weight. A common type of a recoilless infantry gun is, as a rule, served by two operators, but also one-man weapons have been constructed. In order to obtain sufficient efficiency, the weapon has to have a tube of full calibre which encloses the projectile. The wall of the tube must, however, be designed to endure the pressure from the gun powder gas and this fact restricts the possibility of saving weight when the tube is constructed. It has been found out that the strains on the wall of the tube may be very much reduced by using a centrally located high-pressure chamber for the gunpowder charge, said high-pressure chamber having an under-calibre, and a strong wall and being provided with gas exhaust openings. A high-pressure gunpowder chamber of that kind has small dimensions and, therefore, it does not appreciably increase the weight.

As a rule, the high pressure-chamber is tube-shaped and preferably connected to the projectile by means of an easily exchangeable connecting member, such as a break-pin so that it may be inserted in the tube together with the projectile but be separated from the latter at the firing.

It is a special problem, however, to prevent the gunpowder chamber to be thrown out at a high velocity forwards or backwards, so that it should behave as a projectile which could be dangerous for one's own troop. It is also desirable to prevent the high-pressure chamber from being displaced from its coaxial position before the projectile has left the tube. For the correct positioning of the high-pressure chamber, it is necessary to provide supporting means which in some way are connected to the wall of the firing tube round the chamber. It has, however, proved to be difficult to make a thin-walled, light and inexpensive firing tube if the inner surface of its wall should be provided with supporting means of that kind.

One object of the present invention is to provide a solution to that problem. According to the invention, there is a spacing member provided, which has thin walls and/or is made from a light material such as plastic or carton.

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Said spacing member is located behind the gunpowder chamber and connected to the latter or to the wall of the firing tube adjacent to the rear end of the latter, the length of said spacing member being fitted for locating the gunpowder chamber within a zone where the forwardly directed gunpowder gas stream will be substantially of the same strength as the gunpowder gas stream which is directed backwards.

By using a spacing member which is fastened to the rear end of the firing tube for keeping the high-pressure chamber connected to the projectile in place, also other advantages are obtained. Firing tubes which are made to suit a certain type of projectiles to which a high-pressure chamber is connected, may also find a rather extensive use for other such projectile and gunpowder chamber combinations, which have the same projectile calibre but which differ in weight, shape and length. It is, in such cases, only necessary to change the spacing member. The fixing of the spacing member to the rear end of the firing tube is rather easy to do, because said rear end is accessible to such an operation. Said fastening may take place in several ways. It may be made by utilizing the constriction of the firing tube in front of the exhaust nozzle. The rear end of the spacing member may have the shape of a spoked wheel, the periphery of which is glued to the wall of the firing tube. The rear end of the spacing member may also be shaped as or provided with a damming washer which will be broken through by the firing.

The invention will now be described by way of example, reference being had to the accompanying drawing.

FIG. 1 illustrates the general shape of a recoilless weapon according to the invention.

FIG. 2 illustrates, on a larger scale, a longitudinal section of an embodiment of the invention.

The weapon according to FIG. 1 comprises a firing tube 1 which is provided with an exhaust nozzle 12 and a constriction 5 in front of said nozzle. The weapon is further provided with a fin projectile 2, a high-pressure gunpowder chamber 3, a spacing member with a front tubular part 4 and a rear part, said rear part forming fastening members 10 and 11 for said gunpowder chamber. The rear end of the projectile is provided with a fin holder 8, said fin holder being connected to the high-pressure gunpowder chamber by means of a shearing pin 9.

The wall of the high-pressure gunpowder chamber is provided with a number of exhaust openings for the gunpowder gases. The rear end of said chamber is connected to the tubular spacing member 4, for example by means of a shearing pin. The fastening member consists of a cup-shaped shell 11, for example of plastic material, said shell being provided with a cylindrical part 10 at the front end thereof, said front part being connected to the spacing member 4. The cup-shaped shell 11 abuts against the inner wall of the exhaust nozzle 12 and is kept in place by means of an annular member 6 round the rear rim of said nozzle.

Instead of the annular member 6, a tape of textile or plastic material may be used, said tape adhering to the outside of the shell 11 and the firing tube.

In the embodiment according to FIG. 2, only the rear part of a firing tube 17 belonging to the weapon is shown. said weapon has an aerodynamically controlled projectile of a type which has a steering tube 15 instead of fins. Such a projectile, which is already known, and which is designed for directed bursting action, is provided with a projectile body with a blunt, substantially conical front surface, said front surface having a short rear rim and a slightly tapering mantle surface behind said rear rim. Only the rear end of said projectile is shown on the drawing. The projectile is provided with a shaped charge 14 for directed blasting effect. The slightly tapering mantle surface of the projectile is designated 13. Said mantle sur-

face 13 passes over to a more strongly tapering part 30 which is provided with a fitting for a coaxial tubular member 29.

Behind the projectile, there is a high-pressure gunpowder chamber 25, said gunpowder chamber being provided with exhaust openings 16 in its mantle wall as well as in its end walls. Plates 26 are welded to the front end of said gunpowder chamber, said plates being fastened to the tubular member 29 by means of an annular steel member 28 and a breaking pin 27.

A plate 18 is fastened to the rear end of the high-pressure gunpowder chamber by welding, said plate 18 being provided, at the rear end thereof, with an annular steel member 20, which is fastened to the plate 18 by welding, said annular member 20 being adapted to abut against the inner surface of the constriction 24 of the firing tube 17. A rod 22, which is provided with a nut, is welded to the rear end of said plate 18. A washer 21 is passed over the rod 22, said washer 21 being adapted to abut against the inner surface of the nozzle 23. This washer constitutes a damming washer and it is preferably made of plastic. The plate 18 is a spacing member, and by means of this member, the high-pressure gunpowder chamber is not only kept at the desired distance from the rear end of the firing tube but also kept coaxially in the latter. If the high-pressure gunpowder chamber is short and/or if the firing tube is long, the spacing member may be short, but generally its length will be considerably greater than illustrated in the figure. An advantage obtained by the type of projectile illustrated in FIG. 2 is that it is generally shorter than projectiles with fins. Therefore, the firing tube can be better utilized, as the projectile will be located more close to the middle of the firing tube. Generally, this means that the spacing member will be rather long.

The spacing member may be shaped and fastened to the high-pressure chamber and to the firing tube in many different ways. The spacing plate 18, FIG. 2, may be welded together with two side plates, to a cross-shaped member in order to provide a better centering effect. The spacing tube 4 according to FIG. 1 and the fastening means 10, 11 may be made integral in one piece if this is possible from a manufacturing point of view. An advantage with a tube-shaped spacing member lies in the fact that it is easy to fasten to the high-pressure gunpowder chamber by being pushed into or onto the rear end of the latter. Since the rear end of the spacing member has to be provided with a broader portion, or to be shaped that way, in order to abut against the inner wall surface of the firing tube, it is generally preferable to provide said broader portion with reinforcing ribs, arranged, for example, as the spokes of a wheel. There may be wall portions between said reinforcing ribs, said wall portions being thinner and easily broken through and serving as a substitution for a damming washer. It is, however, pos-

sible to use a cross-shaped or star-shaped spacing member instead of a tubular spacing member. In that case the spacing member may be adapted to abut against the wall of the firing tube, along a greater part of said wall behind the high-pressure gunpowder chamber. Thereby, this chamber will be more effectively kept in a coaxial position in the firing tube.

I claim:

1. A recoilless weapon comprising, an aerodynamically steered projectile, a firing tube within which the projectile is contained, a high-pressure gunpowder chamber, said high-pressure gunpowder chamber having smaller calibre than said projectile, said high-pressure gunpowder chamber having strong walls and exhaust apertures in its side walls, the high-pressure gunpowder chamber being located coaxially behind the projectile and connected to the same by means of an easily interrupted connection, a spacing member located coaxially behind said high-pressure gunpowder chamber in the firing tube, the front end of said spacing member being connected to the rear end of the gunpowder chamber, the rear end of the spacing member being connected to the rear end of the firing tube, said spacing member keeping the gunpowder chamber located within a portion of the firing tube where a forwardly-directed gunpowder gas stream exerts a force from the gunpowder chamber which is approximately equal to the force exerted by a rearwardly-directed gunpowder gas stream.

2. A recoilless weapon according to claim 1, wherein the ends of said high-pressure gunpowder chamber are provided with exhaust openings, the front end of the spacing member engaging the rear end of the gunpowder chamber, thereby effecting a centering of said gunpowder chamber in the firing tube.

3. A recoilless weapon according to claim 1 wherein said spacing member is provided with portions abutting against an inner wall part of the firing tube for centering the high-pressure gunpowder chamber in the firing tube.

4. A recoilless weapon according to claim 1, wherein said spacing member is attached to the rear end of the firing tube by an annular member, said annular member having a U-shaped cross section which embraces a rear-most, annular rim provided on the spacing member, and the firing tube having a rearmost annular rim embraced by the annular member.

5. A recoilless weapon according to claim 1, wherein said spacing member is provided with a bottom washer which is easily ruptured, said bottom washer forming a closure for a rear exhaust opening of the firing tube.

No references cited.

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