PLASTIC MUSHROOM HEAD PACKING

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FOREIGN PATENTS OR APPLICATIONS

637,148 3/1962 Italy 89/22
443,199 8/1912 France 89/24
522,431 11/1934 Italy 89/17

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ABSTRACT

A plastic mushroom head packing for gun breechblocks movable crosswise to the core of the gun barrel, which comprises a carrier which receives the mushroom head packing. The carrier is axially displaceable on an axle disposed parallel to an axis of the barrel and is secured on a branch member of the gun barrel and swingably mounted cross-wise to the axis of the barrel.

1 Claim, 4 Drawing Figures
PLASTIC MUSHROOM HEAD PACKING

The present invention relates to a plastic mushroom head packing for guns, which is brought out of the range of the rear opening of the barrel for loading the guns. Such mushroom head packings operate in the manner of a stopper, which is pressed into the barrel opening from the rear and thus rearwardly seals up the barrel against gas pressures during firing. The sealing is provided by a plastic ring consisting primarily of synthetic materials, which presses against an inner conical face.

Mushroom head packings of this type have been used until now primarily in connection with guns having a screw type breechblock, whereby they travel out or move out with the breechblock for loading in the direction of the barrel axis of the guns. These mushroom head packings have been found satisfactory, yet they are not by all means suitable for use in the flat wedge breechblocks, primarily used today. The wedge breechblock offers, relative to the screw type breech, great advantages concerning automation and safety of the gun.

It is one object of the present invention, to provide a plastic mushroom head packing, having the advantages of the flat wedge breechblock relative to the screw type breechblock, as well as those of the plastic mushroom head packing, relative to other packings, by providing a mushroom head packing which can also be used for flat wedge breechblocks.

It is another object of the present invention, to provide a plastic mushroom head packing, wherein the mushroom head packing is successively displaceable axially relative to the gun barrel and pivotally crosswise thereto. For this purpose, the mushroom head packing is rotatably mounted on an axle, which is disposed parallel to the axis of the barrel. The pivoting of the mushroom head is accomplished by a helically toothed pinion, connected with the mushroom head at its pivot point, which is in engagement with a likewise helically toothed, displaceable gear rack. In order to obtain, with the same engagement, rotation, as well as the displacement of the mushroom head, it is provided, in accordance with the present invention, that the helically toothed pinion can be locked against rotation along the requisite axial displacement range of the mushroom head, and at the end of the displacement path can be released again such, that by displacement of the gear rack with the pinion being locked, by the axial force which occurs with a helically toothed gear, the pinion is displaced, and only after the release is rotated by the continued stroke of the gear rack. The locking and releasing of the pinion takes place in such a manner, that the pinion is in operative engagement in a pin with a longitudinal groove formed in the axle, and that this longitudinal groove is followed by an annular groove such, that at the end of the requisite displacement path, the pin enters into this annular groove and thereby releases the pinion for rotation. The gear rack, which starts the entire movement, is rigidly connected with a moveable breech member, corresponding with the known flat wedge breechblocks, such that the movement of the mushroom packing head is directly coupled with that of the breech member. A wedge shaped member is furthermore arranged such, that by sliding thereof, cross-wise to the barrel, in the direction toward the barrel center, the mushroom head packing can be pressed thereto. It is of particular advantage of the present invention that the total working cycle, as lifting the wedge shaped member and axial displacement, as well as swinging of the mushroom head packing is derived from the stroke of the breech member.

With this and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIG. 1 is an elevation, partly in section, of the mushroom head packing, shown closing the opening of the barrel and its arrangement in the bottom member, shortly prior to the opening;

FIG. 2 is a vertical section through the mushroom head packing shown sealing the barrel;

FIG. 3 is an elevation of the inner section of the mushroom head packing in the open position; and

FIG. 4 is a section of the device showing the pinion on its axle in engagement with the gear rack.

Referring now to the drawings, the mushroom head packing 1 comprises, in known manner, a mushroom head carrier 2, in which a plastic packing ring 3 is secured by means of the mushroom head 4 and an annular nut 5. The mushroom head packing 1 is mounted rotatably and displaceably about an axle 6 arranged parallel to the axis of the barrel. The axle 6 is rigidly screwed into the rear end of the gun barrel 12. A helically toothed pinion 7 is provided on the mushroom head carrier 2 and is disposed on this axle, which pinion 7 is in engagement with a gear rack 8. A pin 9 is arranged in the pinion 7 and the mushroom head carrier 2, respectively, in accordance with FIG. 4, which pin 9 engages a longitudinal groove 10 of the axle 6. An annular groove 11 follows this longitudinal groove 10. The gear rack 8 is secured in a moveable breech member 13, which is controlled by rollers 14 engaging a cam 15. A wedge shaped member 16 is driven by means of levers 17 over rollers 18. The entire procedure of the opening and closing of the mushroom head packing 1 is controlled by the advancement of the gun barrel 12. The advancing gun barrel 12 takes the breech member 13, which is slidably connected with the gun barrel 12, cross-wise to the axis of the barrel and forwardly, which breech member 13 runs up thereby with its rollers 14 onto the cam 15 and is lifted. In the first phase of lifting, the wedge shaped member 16 is lifted by means of the levers 17 over the rollers 18 into the position shown in FIG. 1. During further lifting of the breech member 13, at first the mushroom head packing, which is locked against rotation, is displaced, by the helically toothed pinion-gear rack combination 7 and 8, due to the axial force component caused by the helical toothed pinion. The locking of the mushroom head packing against rotation is accomplished by the pin 9 being arranged in the pinion 7 and the mushroom head carrier 2 such that it engages the longitudinal groove 10 formed in the axle 6. The mushroom head packing 1 is then displaced, until the pin 9 has reaches the annular groove 11 following the longitudinal groove 10, and is thereby freed for rotation. With the remaining lifting movement, the mushroom head packing 1 is turned into the position shown in FIG. 3, whereby the breech member 13 assumes its highest position and remains there, until the
loading process is terminated. Upon completion of the loading process, the breech member 13 is forced again into its lowermost position, whereby the mushroom head swings back again by means of the pinion-gear rack combination 7, 8 and is displaced in the closing direction. In the lower range of movement of the breech member 13 simultaneously the wedge shaped member 16 is then simultaneously brought downwardly into locking position in front of the mushroom head packing 1. The wedge shaped member 16 can be formed as may be desired under certain circumstances as a primer-magazine as indicated in FIG. 2.

While we have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense.

I claim:

1. A gun breechblock with a mushroom head packing cooperating with a gun barrel, comprising a breech member displaceable crosswise to the axis of said gun barrel, said breech member operatively connected to said gun barrel for movement by the latter, first means for effecting said displaceable crosswise movement of said breech member upon movement of the latter by said gun barrel, a mushroom head packing operatively disposed to close an opening of said gun barrel in a closed position and operatively supported in said closed position by said breech member, a mushroom head carrier on which said mushroom head packing is disposed, an axle secured on said gun barrel and oriented parallel to the axis of said gun barrel, a mushroom head carrier being operatively mounted for axially displaceable movement on said axle as well as pivotally relative to said axle for movement substantially crosswise to said axis of said gun barrel, in succession, and second means for effecting said movements in succession of said mushroom head carrier, upon crosswise movement of said breech member, said second means comprising a helical toothed pinion and an operatively cooperating helical tooth rack, the latter being mounted on said breech member, said mushroom head carrier is operatively mounted on said axle by means of said helical toothed pinion, the latter being disposed on said axle and connected to said mushroom head carrier, a pin mounted on said helical toothed pinion, said axle having a longitudinal groove in which said pin is guided, said pinion being locked against turning over a range corresponding to the axial displacement range of said carrier by means of said pin guided in said longitudinal groove, and said axle being formed such that said pin is released from said longitudinal grooves at an end of said range corresponding to said axial displacement range of said mushroom head carrier, whereby during an opening movement of said breech member caused by movement of said gun barrel, said mushroom head carrier due to the axial force occurring by said helical toothed pinion and said helical tooth rack is first axially displaced away from said gun barrel and after release of said pin from said longitudinal groove is pivoted substantially crosswise to said axis of said gun barrel.

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