

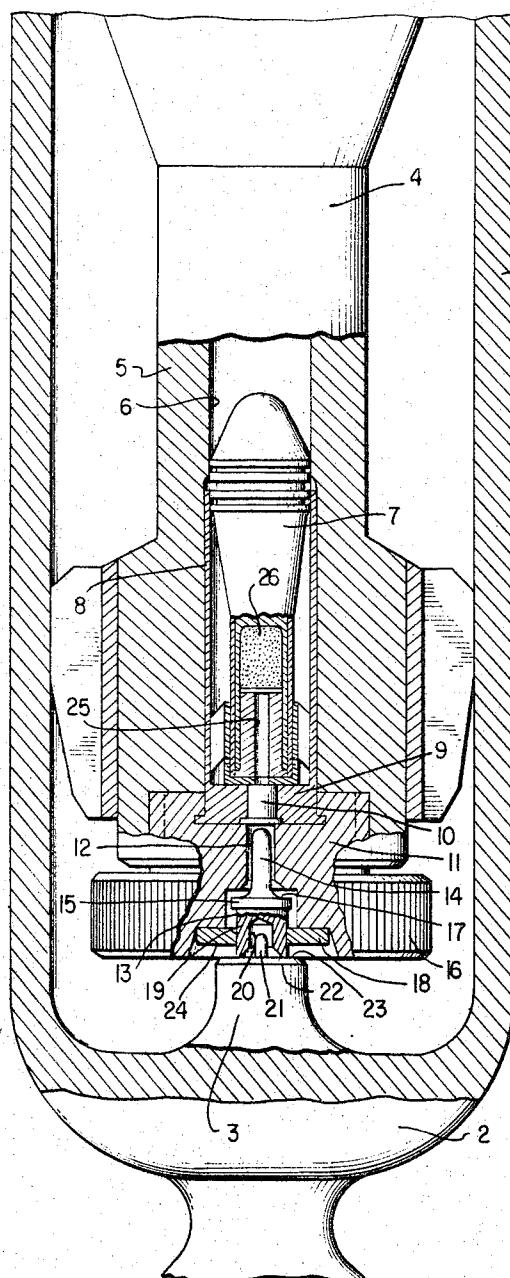
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PRACTICE AMMUNITION

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## PRACTICE AMMUNITION

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The present invention relates to a practice ammunition for mortars and more particularly to a release or firing mechanism for the primer of mortar practice ammunition.

As with numerous other weapons, it is also customary with mortars to utilize for purposes of practice firing or target practice, ammunition which is substantially smaller in caliber than the corresponding live ammunition. For purposes of achieving conditions which approximate as close as possible the reality, an ammunition body is used therefor as dummy which has the form of a live shell. The small caliber practice ammunition to be fired is thereby held in the rear end of a continuous central bore of the shell dummy serving as firing barrel or provided with a liner by a closure means detachably secured on the rear end thereof by a plug or threaded connection or the like and is inserted by means of this shell dummy into the mortar barrel. With respect to the shell dummy, provision may thereby be made that the shell dummy remains behind in the mortar barrel during firing and subsequently is pulled out of the same by means of a chain. However, it has also been proposed already to eject the shell dummy out of the mortar barrel by means of an ejection charge whereby the ignition of the ejection charge and of the propellant charge for the small caliber practice shell is effectuated by one and the same ignition process, and furthermore such an arrangement is made that the ejection of the shell dummy only takes place after the practice shell has already left the mortar barrel.

The mortar heretofore designated as "trench mortar" is, as is known, a gun in which the ammunition is loaded from in front into the relatively steeply inclined mortar barrel closed at the rear end by means of a bottom. At the bottom of the mortar is centrally arranged either a stationary firing pin or an axially movable striker or firing pin adapted to move by manual actuation on which impinges the shell with its primer inserted into the barrel and sliding downwardly within the same, or which is driven into the primer of the shell when seated against the barrel bottom or when seated on the barrel bottom by means of an abutment surface formed into the shell, whereby in both cases the ignition of the propellant charge is initiated. The firing pin may be exposed by reason of dud shells, pierced primers and the like under certain circumstances to a relatively high load during which frequent firing may lead to wear appearances and eventually to damages, for example, breakage by fatigue appearances, etc., whereby the proper functioning of the gun is jeopardized so that the gun under circumstances is not ready to use in case of emergency.

The present invention aims to enable the firing from a mortar of a small caliber practice ammunition, inserted into a dummy shell and held in the rear end thereof within a central firing bore by means of a closure cap, without utilizing thereby the firing pin of the mortar, i.e., in such a manner that the firing pin does not appear in the functioning. According to the present invention, this is achieved in that the closure cap is provided with a continuous central bore or the like and an auxiliary striker or firing pin is arranged within this bore which is axially movable between two end positions, which faces

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with its point or tip the primer of the practice ammunition and which is provided at its opposite end with a central axial bore whose length and cross-sectional dimensions are selected larger than the corresponding dimensions of the firing pin of the mortar, and which is additionally so dimensioned that in one end position thereof it is with its tip or point located completely within the closure cap bore while it projects with its opposite end beyond the rear end surface cooperating with the mortar barrel bottom or with an abutment surface formed thereon or which projects beyond an abutment surface formed thereon, whereas in the other end position it projects with its tip to such an extent beyond the closure cap surface on the side of the practice ammunition that a safe ignition is assured of the primer of a practice cartridge, shell, or the like inserted into the shell dummy.

It is assured by the arrangement and construction in accordance with the present invention that during downward sliding movement of the shell dummy with inserted practice shell, at first the auxiliary firing pin impinges with its ring-shaped rear end on the mortar barrel bottom or on the abutment surface whereby it overlaps without contact the firing pin of the mortar projecting from the mortar barrel bottom, and thereupon in the course of the further downward movement of the shell dummy together with the inserted practice shell, up to the point of impingement with the rear end surface of its closure cap or of the abutment surface formed thereon, is displaced relative to the shell dummy or to the practice shell out of the one end position in the direction of the other end position and thereby is driven with its tip or point into the primer of the practice shell so that the latter is ignited and therewith, in the further course of the ignition, ignites the propellant charge. A particular advantage of the present invention resides in the fact that it represents an integral component of the shell dummy so that no measures or changes have to be undertaken at the mortar itself, i.e., the mortar is ready for use at any time with live ammunition. A further significant advantage of the arrangement and construction in accordance with the present invention is the fact that with corresponding construction and arrangement and with one and the same auxiliary firing pin or possibly by easy and simple exchange of the auxiliary firing pin, which does not impair the ready usability of the mortar, as well as possibly by a necessary replacement of the firing pin with a different one, a completely satisfactory ignition of the ammunition propellant charge is assured also in mortars of different manufacture.

Accordingly, it is an object of the present invention to provide a firing device for practice ammunition of mortars which is simple in construction yet obviates the shortcomings and drawbacks encountered with the prior art constructions.

It is another object of the present invention to provide a firing mechanism for practice ammunition of mortars which protects the firing pin of the mortar or striker thereof against any wear and tear that might otherwise occur during use of the mortar with practice ammunition.

A still further object of the present invention resides in a firing mechanism for practice ammunition of mortars which is safe in operation as well as reliable to assure ready usability of the mortar at all times with live ammunition.

Still another object of the present invention resides in a firing mechanism for practice ammunition of mortars which completely eliminates the use of the normal firing pin of the mortar for firing the practice ammunition.

A still further object of the present invention resides in a firing mechanism for practice shells of mortars which not only achieves the aforementioned aims and objects in a particularly effective and simple manner without the

need of any modifications in the mortar but which also can be readily used for practice ammunitions supplied by different manufacturers.

These and other objects, features, and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawing, which shows, for purposes of illustration only, one embodiment in accordance with the present invention, and wherein:

The single figure is an axial cross-sectional view 10 through one embodiment of a firing mechanism for the practice ammunition of mortars.

Referring now to the single figure of the drawing, reference numeral 1 designates therein the mortar barrel provided with a bottom 2. The small caliber practice shell which is constructed in the shape of a cartridge and includes the shell 7 and the cartridge case 8 is retained by the use of the liner 5 in the rear end of the continuous central bore 6 of the shell dummy 4, which corresponds to a live shell as regards shape and dimensions, by means of the threaded-on closure piece 11 having a knurled knob 16. The small caliber practice shell 7, 8 directly and accurately faces with the primer 10 thereof arranged in the case bottom 9 the auxiliary firing pin 13 inserted into the continuous central bore 12 of the closure piece 11. The auxiliary firing pin or striker 13 is guided with its tip 14 in the narrow part of the bore 12 so as to slide easily and is displaceably held with the flange 15 in the enlarged part of the bore 12 so as to be freely movable between two end positions but limited in the axial direction by means of shoulder 17 toward one side and by means of the plate 18 threaded or otherwise secured to the closure piece 11 toward the other side. The enlarged rear end 19 of the auxiliary firing pin 13 is provided with a central aperture or blind end bore 20 whose length and cross-sectional dimensions are selected considerably larger than the corresponding dimensions of the firing pin 21 of the mortar which is constructed in the illustrated embodiment as stationary firing pin on the central base-shaped projection 3 of the bottom 2 of the mortar barrel 1.

As can be readily seen from the drawing, the auxiliary striker pin 13, which is already seated with its ring-shaped rim 22 on the end surface 23 of the base 3 and is already displaced from its rear end position by a certain distance in the direction of its forward end position and thereby is so positioned that it just barely contacts with its tip 14 the primer 10 of the practice shell is displaced upon further downward movement of the shell dummy 4 relative to the mortar barrel 1 by a further distance in the direction of its forward end position, and more particularly for such length of time until the abutment surface 24 of the plate 18 abuts against the end face or abutment surface 23 of the support 3 or the forward end face of the flange 15 abuts against the shoulder 17 of the bore 12, which may also be achieved simultaneously with corresponding construction of the parts as indicated in the drawing. The tip or point 14 of the auxiliary firing pin 13 then projects forwardly out of the bore 12 by a corresponding distance and penetrates with this projecting part into the primer 10 and therewith ignites the same. The ignition flame penetrates by way of the ignition channel 25 into the propellant charge 26 and thus starts the ignition thereof.

As can also be determined readily from the drawing, a relatively large amount of play is available for the construction of the auxiliary firing pin so that the latter can be matched readily to the corresponding conditions or, if necessary, can also be readily replaced with a corresponding firing pin of different construction which can be carried out as well as a possibly necessary replacement of the firing pin outside of the mortar and thereby without impairing the ready usability thereof.

While we have shown and described one embodiment in accordance with the present invention, it is understood

that the same is not limited thereto but is susceptible of numerous changes and modifications as known to a person skilled in the art. For example, the illustrated conditions as well as the arrangement and construction of the parts are shown only for purposes of illustration and can be selected differently or made in different ways as known to a person skilled in the art.

Thus, the present invention is susceptible of numerous changes and modifications as known to a person skilled in the art, and we therefore do not wish to be limited to the details shown and described herein, but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

We claim:

1. A mechanism for initiating the ignition of the propellant charge in practice ammunition of mortars having a mortar bottom and firing pin substantially centrally arranged on said mortar bottom, comprising dummy shell means corresponding in shape and dimensions to the live ammunition and provided with a central bore, practice shell means including propellant charge means and primer means operatively connected with said propellant charge means and located at the rear end of said practice shell means, said practice shell means being adapted to be inserted into the mortar by means of said dummy shell means, means for securely but detachably retaining said practice shell means in the rear end of said dummy shell means including closure means provided with continuous central axial bore means, auxiliary firing pin means arranged within said axial bore means so as to be axially freely movable between two end positions, said auxiliary firing pin means being provided with a tip directed toward said primer means of the practice shell means and being provided at the opposite end thereof with a substantially central axial aperture, said axial aperture having length and cross-sectional dimensions larger than the corresponding dimensions of the mortar firing pin by such an amount that in one end position of said auxiliary firing pin means, the tip thereof is located completely within said axial bore means and the auxiliary firing pin means projects with its opposite end beyond the rear end surface cooperating with the mortar barrel bottom, and said auxiliary firing pin means projecting in the other end positions with the tip thereof to such an extent beyond the end surface of the closure means on the side of the practice shell means that a safe ignition of the primer means is assured.
2. The combination according to claim 1, wherein the mortar firing pin is arranged relatively fixed on the mortar bottom.
3. The combination according to claim 1, wherein the mortar firing pin is axially displaceable.
4. The combination according to claim 1, wherein said closure means includes closure cap means.
5. The combination according to claim 4, further comprising plug-type connecting means between said cap means and the rear end of said dummy shell means.
6. The combination according to claim 4, further comprising threaded connecting means between said cap means and the rear end of said dummy shell means.
7. The combination according to claim 1, wherein said primer means is impact-sensitive.

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