Jan. 2, 1968 G. FREITAG 3,360,879

AUTOMATIC SAFETY MECHANISM FOR TRIGGER ASSEMBLIES OF FIREARMS

Filed Feb. 10, 1967 3 Sheets-Sheet 1

FIG. 1

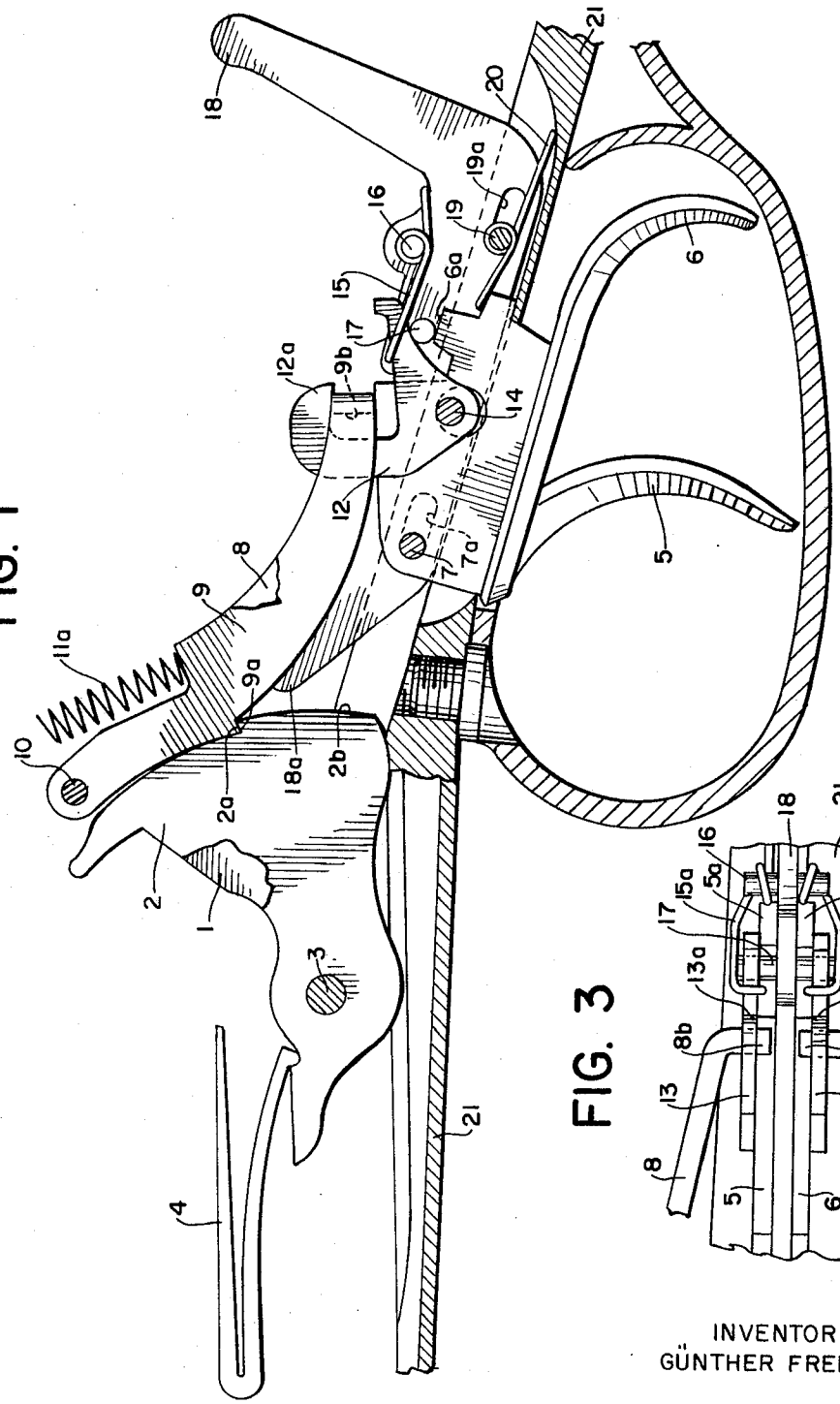

FIG. 3

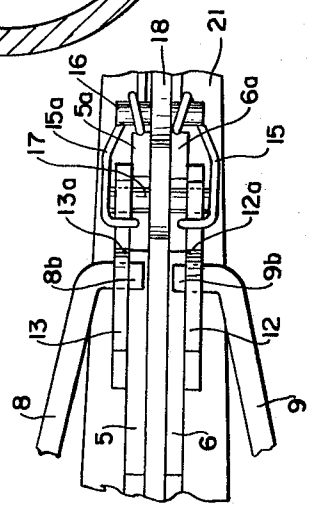

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FIG. 2

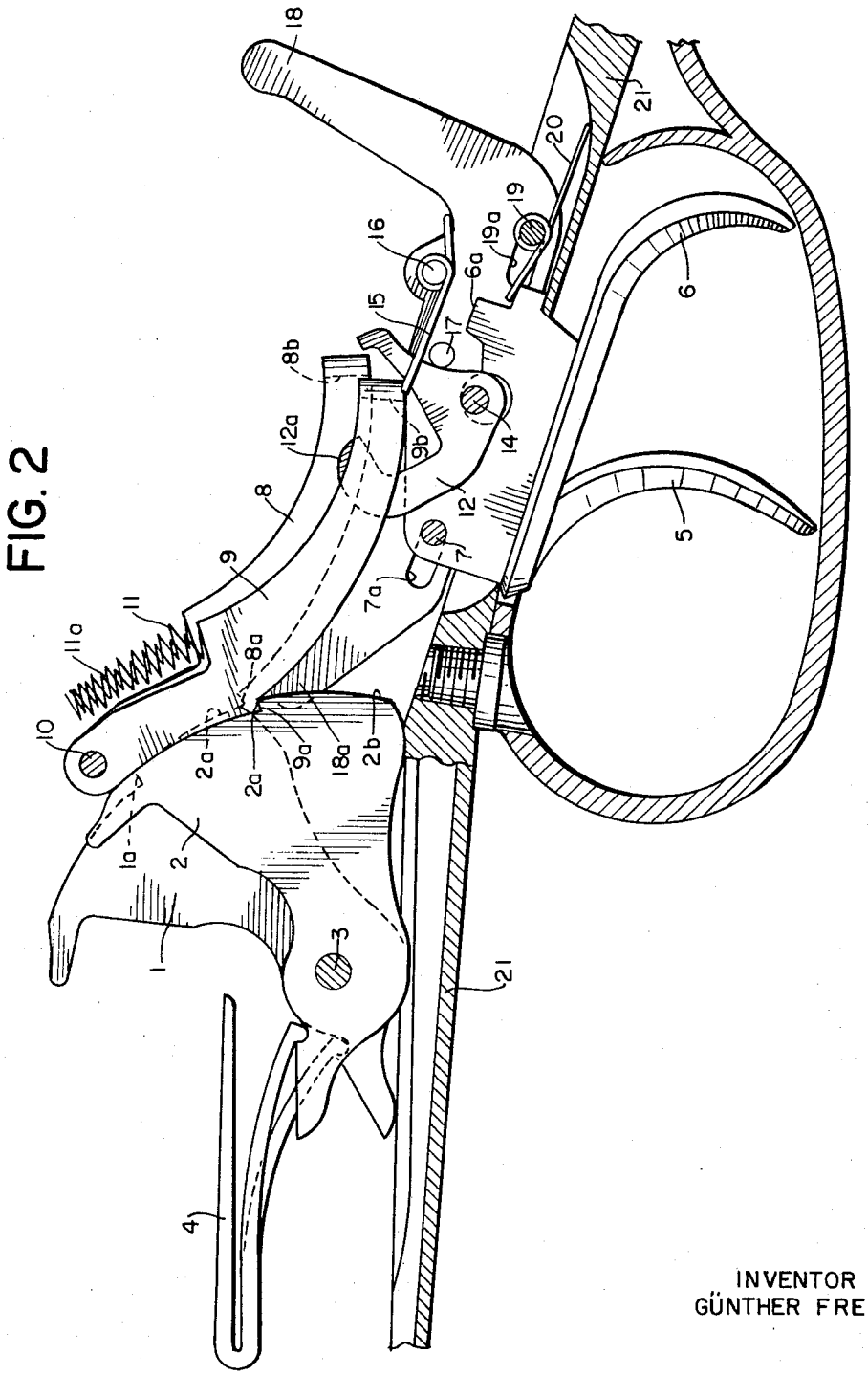

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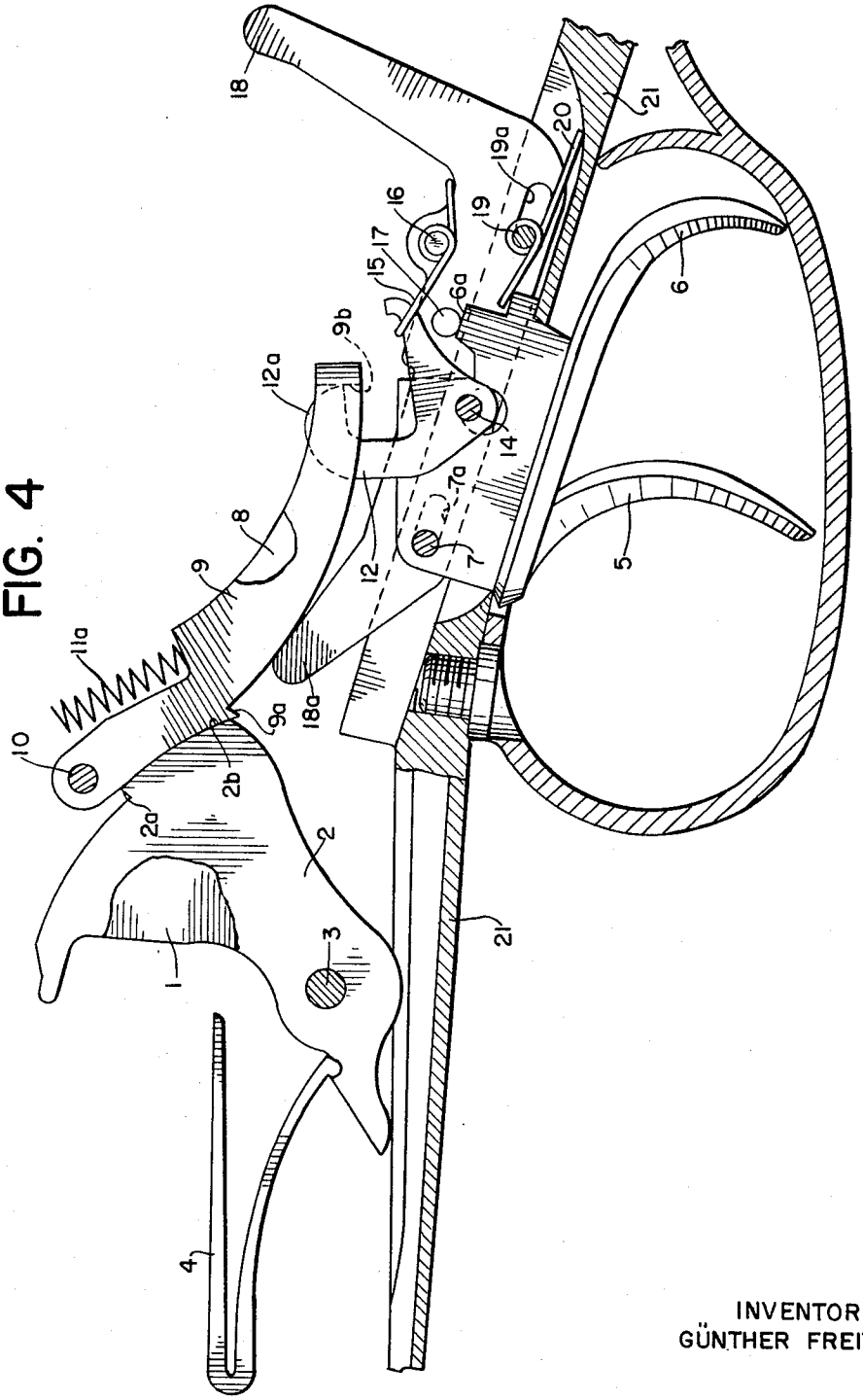
FIG. 4



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AUTOMATIC SAFETY MECHANISM FOR TRIGGER ASSEMBLIES OF FIREARMS

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The present invention relates to firearms. In particular, the present invention relates to safety mechanisms to be used with the trigger assemblies of firearms. The present invention relates particularly to firearms used for hunting or sporting purposes and having multiple barrels as well as multiple trigger mechanisms. Thus, the present invention deals particularly with an automatic safety mechanism to be used with trigger assemblies of multiple-barreled hunting or sporting rifles or other firearms.

According to a known construction of this general type, the trigger actuates a sear which releases the hammer. A two-armed lever which is under spring pressure acts on the trigger and sear, and one arm of this lever is actuated by the trigger while the other arm thereof engages an end of the sear. The arrangement is such that the two-armed lever is carried by an upper cover of a part which is separate from the bolt housing. Thus, this latter part which carries the two armed lever is the upper cover of the bolt housing. The upper and lower covers of the bolt housing have freely extending portions which are connected with the wooden stock of the firearm. As a result there is the possibility of a change in the distance between the upper and lower covers of the bolt housing, and there is the danger that the accurate positioning of the parts with respect to each other will not be maintained in a manner which will assure the proper operation of the safety mechanism.

There is a further known safety mechanism where the safety mechanism acts directly on a two-armed lever so as to prevent movement of the latter lever, since the sear has a front lever arm which must slide over a tooth of the hammer and does not permit cocking of the hammer when the safety mechanism is in its safety position, unless force is applied. The sear has a circular movement, and its rear lever arm is blocked against movement because the movement or yielding of the two-armed lever is not possible, so that as a result one of the other of these parts must be broken when the safety mechanism is engaged. Also with this type of safety mechanism a release of the hammer can only take place in a proper manner if there is a completely predetermined distance between the sear and the trigger so that when the trigger is raised the hook of the lever will be brought at the proper time out of the path of swinging movement of the sear. In the event that this latter space is not maintained, the hammer cannot be released.

In order to avoid these drawbacks there is the problem of completely preventing the possibility of accidental release of the hammer when the safety device is in its safety positoin while the firearm is coked and loaded.

It is accordingly a primary object of the present invention to provide a safety mechanism which will accomplish this latter result while at the same time maintaining its elements in a predetermined unchanged position relative to each other without influencing any of the operations as a result of the distance which is maintained between the elements of the safety mechanism of the invention.

It is also an object of the present invention to provide a structure which will enable the hammers to be cocked when the safety mechanism is in its safety position.

It is furthermore an object of the present invention to

provide for a multiple-barrel firearm, having a pair of hammers and a pair of trigger mechanisms, a safety mechanism which will not only reliably prevent firing of the cocked and loaded firearm when either one or both of the barrels are loaded, but which will also permit either one or both of the hammers to be cocked even when the safety mechanism is in its safety position.

Thus, with the structure of the present invention when the firearm is opened, the operating components will automatically be brought into their operating positions. In this way the firearm is reliably prevented from accidental release of the hammers thereof as a result of any impact, blow, or fall, by blocking of the triggers and sears thereof before the firearm is closed in its cocked and loaded condition. The trigger plate which forms the support means for the structure of the invention is fixedly connected with the breech for faultless operation of all of the elements of the safety mechanism.

The invention is illustrated by way of example in the accompanying drawings for a double-barreled rifle, and in the drawings:

FIG. 1 is a fragmentary partly sectional side elevation showing the safety mechanism of the invention in its safety position with the trigger mechanism cocked;

FIG. 2 shows the parts of FIG. 1 when the safety mechanism has been placed in its release position and after one barrel has been fired;

FIG. 3 is a fragmentary top plan view of the structure of FIG. 1; and

FIG. 4 is a fragmentary longitudinal section illustrating the position which the parts take when the safety mechanism is in its safety positon and the rifle has been fired so that it is in an unloaded and uncocked condition.

The unillustrated breech piece of the rifle carries a pair of turnable hammers **1** and **2**, these hammers being turnably carried by a stationary pivot pin **3**. A pair of hammer springs **4** respectively press on the pair of hammers **1** and **2** to urge them from their cocked positions into their uncocked positions where they will cause firing of the rifle due to the movement of the hammers from their cocked positions by the springs **4**.

The rifle includes a right trigger **5** and a left trigger **6**, both of which are turnably carried by a stationary pivot pin **7** which supports the triggers for turning movement. A pair of springs **20** respectively press on the triggers **5** and **6** so as to urged them at all times into a position where they are ready to be acted upon by the operator. The springs **20** are in the form of wire springs coiled about a guide pin **19** which is stationary, each spring **20** having one arm engaging the support means formed by the trigger plate **21** and another arm engaging a trigger.

Situated over the hammers **1** and **2** are a right sear **8** and a left sear **9**, these sears being turnably carried by a stationary pivot pin **10**. The pair of hammers **1** and **2** are respectively provided with teeth **1***a* and **2***a* which are adapted to be engaged by the teeth **8***a* and **9***a* of the sears **8** and **9** when the latter coact with the hammers to maintain them in their cocked positions. A pair of compression springs **11** and **11***a* respectively press against the sears **8** and **9** so as to urge them to turn in a clockwise direction about the pin **10**, and during cocking of the firearm the teeth **8***a* and **9***a* of the sears will, under the action of the springs **11** and **11***a*, snap in front of the teeth **1***a* and **2***a* of the hammers **1** and **2**, so that the sears **8** and **9** assume the lower cocked positions illustrated in FIG. **1**. In these lower positions, the sears **8** and **9** respectively engage the triggers **5** and **6**. At their rear ends the sears **8** and **9** have arms **8***b* and **9***b* (FIG. 3), and it is these arms which engage the triggers when the parts are in the cocked position of FIG. **1**.

When the firearm is opened an unillustrated breech lock shifts a safety member **18** of the invention into its rear safety position, this safety member **18** being supported for shifting movement by the support means formed by the trigger plate **21** and having a front end **18***a* which is always in engagement with the breech bolt. The safety member **18** is formed with slots **7***a* and **19***a* through which the stationary pins **7** and **19** respectively extend, these pins being carried by and forming part of the support means **21**, so that in this way the pins **7** and **19** coact with slots **7***a* and **19***a* to guide the safety member **18** for shifting movement between its rear safety position and its front release position.

A pair of spring means **15** and **15***a* are connected to the shiftable safety member **18** for movement therewith. For this purpose the member **18** fixedly carries a pin **16** about which the springs **15** and **15***a* are coiled, and these springs have front hook-shaped ends which respectively engage rear arms of a pair of safety catches **12** and **13** which are in the form of a pair of levers turnably carried by the stationary pivot pin **14** which is fixedly carried by side walls of the trigger plate **21** which forms the support means for the structure of the invention. Thus, during the rearward displacement of the safety member **18** into its safety position, the springs **15** and **15***a* coact with the safety catches **12** and **13** to turn the latter in a clockwise direction about the pin **14**, and these catch levers **12** and **13** which form the safety catches respectively have hook ends **12***a* and **13***a* which extend over and engage the arms **8***b* and **9***b* of the sears **8** and **9** so as to reliably prevent movement of the sears in a counterclockwise direction about the pin **10**, as viewed in the drawings, when the hammers are cocked and held in their cocked position by the sears and when the safety mechanism has been placed in its safety position by rearward shifting of the safety member **18**. Thus, in the cocked position shown in FIG. 1, which also illustrates the safety mechanism in its safety position, the free hook ends **12***a* and **13***a* of the safety catch levers **12** and **13** extend over and engage the arms **8***b* and **9***b* at the rear of the sears **8** and **9** so as to prevent the latter from releasing the hammers **1** and **2**.

The safety member **18** also carries a safety pin **17** toward which the arms of the levers **12** and **13** which are engaged by the springs **15** and **15***a* are urged by these springs, and this safety pin **17** engages upper projections **5***a* and **6***a* of the triggers **5** and **6** when the safety member **18** is in its rear safety position shown in FIG. 1, so that in this way the safety pin **17** prevents actuation of the triggers **5** and **6** by the operator. Thus, the firearm is cocked and at the same time the safety mechanism is in its safety position reliably preventing both movement of the hammers and movement of the triggers. The safety catches **12** and **13** as a result of the action of the hook springs **15** and **15***a* which engage their arms **12***b* and **13***b* are always urged into engagement with the safety pin **17** which is fixedly carried by the shiftable safety member **18** and are compelled to follow all movements of the shiftable safety member **18**.

When the shiftable safety member **18** is shifted to its release position by an unillustrated structure, the safety member **18** is displaced forwardly so that the safety pin **17** turns the catch levers **12** and **13** in a counterclockwise direction about the pin **14** so as to displace the hook ends **12***a* and **13***a* of the catch levers forwardly away from their positions over the arms **8***b* and **9***b* of the sears **8** and **9**, and at the same time the pin **17** is displaced forwardly from the projections **5***a* and **6***a* so that now the safety mechanism is in its release position and the triggers can be actuated with the firearm in its cocked position.

After a shot has been fired, one of the hammers, such as the hammer **1** shown in FIG. 2, for example, is driven forwardly and the tooth **8***a* of the sear **8** now engages the rear elevation **1***b* of the hammer **1**, this rear elevation extending rearwardly from the tooth **1***a* of the hammer **1** and being in the form of a curved rear upper edge portion

of the hammer which by engaging the lower edge of the sear **8** forwardly of the tooth **8***a* thereof raises the sear **8** to the elevated position thereof shown in FIG. 2. A comparison of the positions of the sears **8** and **9** in FIG. 2 will indicate the difference between the upper and lower positions of the sears, the sear **8** being shown in FIG. 2 in its upper position in which it is held by the rear elevation **1***b* of the hammer **1**, while the sear **9** is shown in FIG. 2 in its position retaining the other hammer **2** in its cocked position so that by engagement of the tooth **9***a* with the tooth **2***a* the sear **9** is maintained by the spring **11** in its lower position. When the other barrel is fired the hammer **2** will be driven forwardly by its spring **4** and the rear elevated edge portion **2***b*, which extends to the rear of the tooth **2***a*, will engage the portion of the sear **9** which extends forwardly of its tooth **9***a* to raise the sear **9** to its upper position where it will then have the elevation of the sear **8** shown in FIG. 2.

When the safety mechanism is again returned to its safety position and the parts are in the uncocked position shown in FIG. 4, the free hook ends **12***a* and **13***a* of the catches **12** and **13** will move into engagement with the arms **8***b* and **9***b* but will be incapable of passing thereover because of the fact that the sears are in their upper positions shown in FIG. 4. Thus, at this time the pair of spring means **15** and **15***a* will seek to turn the catch levers **12** and **13** into engagement with the pins **17** but instead the pair of spring means **15** and **15***a* will yield while the arms **8***b* and **9***b* will prevent the levers **12** and **13** from turning to the safety position shown in FIG. 1. When the parts have the position in FIG. 2, it will be possible for the lever **13** which coacts with the sear **8** to be maintained in the position of FIG. 4 where it cannot be moved by the yielding spring **15** to the safety position, because the sear **8** is in the elevated position which is shown in FIG. 2, while at the same time the other spring **15***a* is capable of displacing the catch lever **12** to its safety position where its hook end **12***a* passes over the arm **9***b*, so that with the structure of the invention the safety mechanism will coact with either one or both of the sears depending upon whether one or both of the sears are in their lower positions holding the hammers in their cocked positions.

Thus, with the structure of the invention, and in particular with the structure of the catch levers **12** and **13** and the springs **15** and **15***a*, it is possible to apply the safety mechanism to the structure which is cocked but not released and which is associated with one barrel as well as to the cocked structure which is cocked simultaneously for both barrels, and in addition the safety mechanism can be displaced to the safety position even when both hammers are in the uncocked or release positions thereof shown in FIG. 4. When the structure has the position shown in FIG. 4, the safety mechanism is in its safety position but simply does not retain the sears in their lower positions because the hammers are not cocked. However, there is nothing to prevent the cocking of the hammers with thhe structure of the invention when it has the position of FIG. 4, and as soon as, during the cocking operations, the teeth of the sears snap in front of the teeth of the hammers, the sears assume their lower positions and their rear arms **8***b* and **9***b* slide downwardly with respect to the hook ends **12***a* and **13***a* of the catch levers so that the latter will now snap over the rear arms of the sears to maintain them against release, the parts now having the position of FIG. 1. Of course, it is the springs **15** and **15***a* which urge the catch levers to turn from the position of FIG. 4 to the position of FIG. 1 as soon as the hammers are cocked. Thus, as soon as the sears return to their lower positions the catch levers extend over the sears and the full security of the safety mechanism of the invention is now provided, as shown in FIG. 1.

What is claimed is:

1. In a safety mechanism for a trigger assembly of a multiple-barrel firearm, support means, a pair of triggers carried by said support means, a shiftable safety member

carried by said support means between said pair of triggers for shifting movement relative thereto, a safety pin carried by said shiftable safety member for engaging said triggers to prevent movement thereof when said shiftable member is in a safety position and for releasing said triggers when said shiftable member is shifted to a release position, a pair of safety catches turnably carried by said support means and respectively having catch hooks, a pair of spring means carried by said shiftable safety member and operatively connected with said pair of safety catches for respectively urging them to turn in a given direction and for turning said safety catches in response to movement of said shiftable safety member, and a pair of sears respectively coacting with said pair of triggers and respectively having arms with respect to which said hooks of said safety catches have engaged and disengaged positions.

2. The combination of claim 1 and wherein said pair of spring means respectively urge said pair of safety catches into engagement with said safety pin.

3. The combination of claim 1, further comprising pivot means supporting said sears for turning movement, a pair of additional spring means urging said sears to turn with respect to said pivot means, respectively, and a pair of hammers respectively having teeth, said sears respectively having upper portions urged against said hammers by said pair of additional spring means, and said hammers respectively having elevations situated to the rear of said teeth thereof.

4. The combination of claim 1 and wherein a pin is carried by said shiftable safety member and connects said pair of first-mentioned spring means thereto, said first-mentioned spring means being in the form of a pair of hook-shaped springs having free hook ends and said pair of safety catches respectively having arms engaged by said hook ends of said pair of hook-shaped springs, said

support means having a pivot pin on which said pair of safety catches are supported for turning movement.

5. The combination of claim 1 and wherein a pair of hammers respectively coact with said pair of sears and are each movable between cocked and uncocked positions, said sears respectively having a pair of teeth and said hammers respectively having a pair of teeth respectively engaged by said teeth of said sears to be held by the latter in said cocked positions, said hammers respectively having to the rear of said teeth thereof elevated portions which maintain said sears in elevated positions, respectively, when said hammers are in their uncocked positions, and said hooks of said safety catches being incapable of extending over and engaging said sears at said arms thereof. When said sears are in their elevated positions, said pair of spring means respectively yielding when urging said safety catches to the safety positions where said hooks tend to extend over said arms of said sears but are prevented from doing so when said sears are in their elevated positions, said hammers when placed in their cocked positions releasing said sears, by engagement of said teeth of said hammers with said teeth of said sears, for movement to lower positions where said hooks of said safety catches can pass over said arms of said sears.

6. The combination of claim 5 and wherein said spring means urge said catches toward said safety pin, said safety pin, when said shiftable safety member is moved to said release position, engaging said safety catches and displacing them to positions releasing said sears for movement by said triggers to release said hammers, said safety pins also releasing said triggers for movement when said safety member is shifted to said release position thereof.

No references cited.

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