April 14, 1931. J. M. BROWNING 1,801,070

BREECH MECHANISM FOR FIREARMS

Filed June 12, 1929

Fig. 1

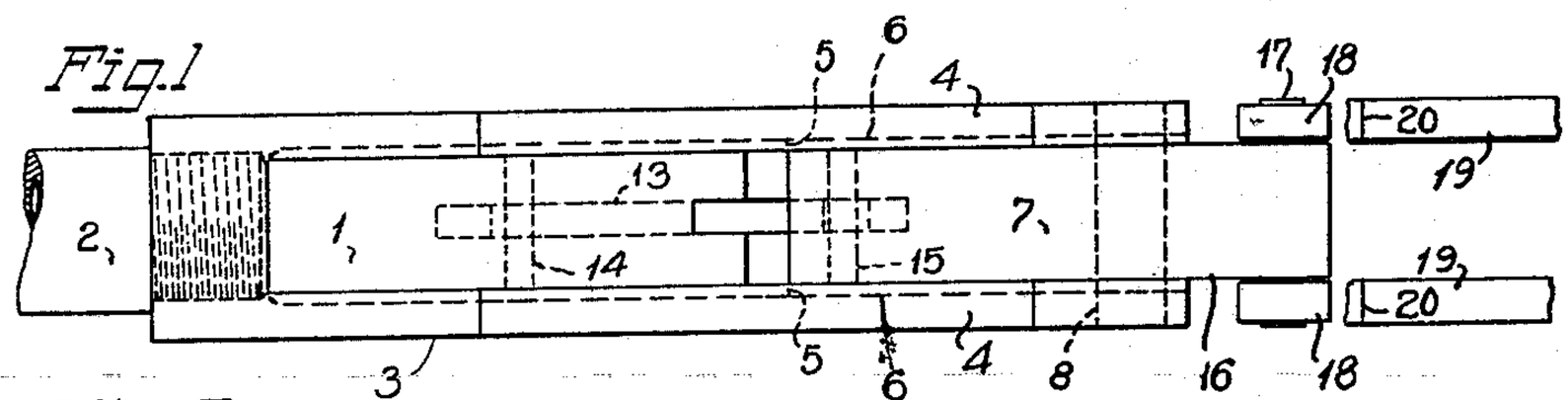


Fig. 2

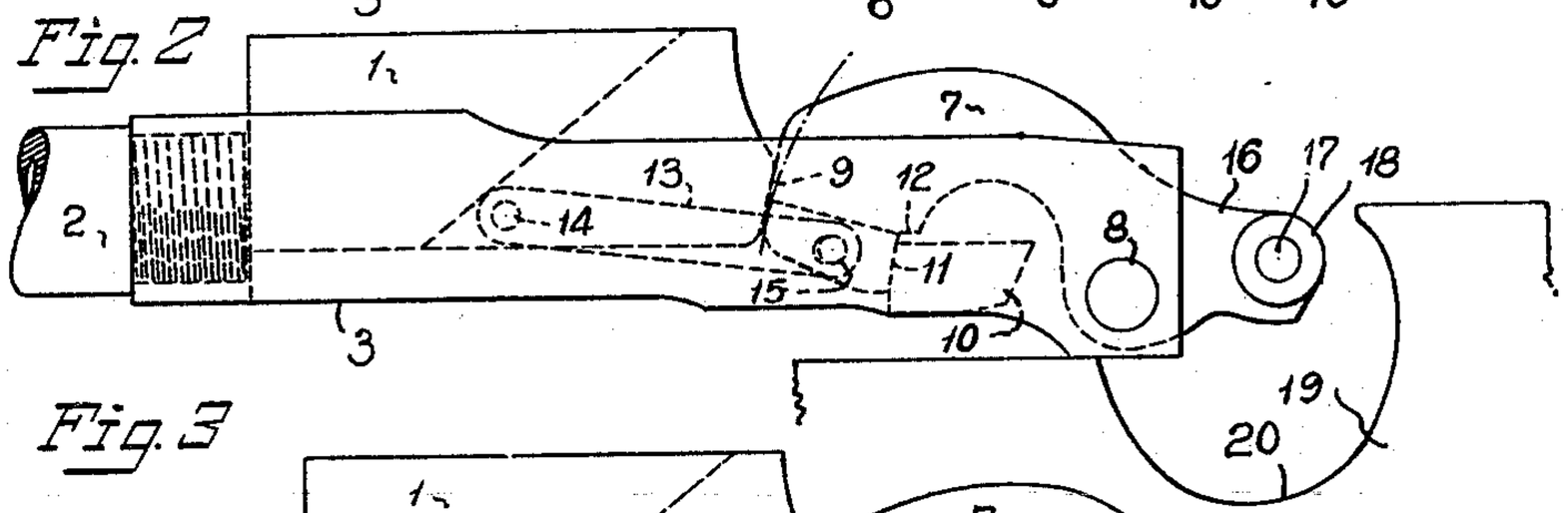


Fig. 3

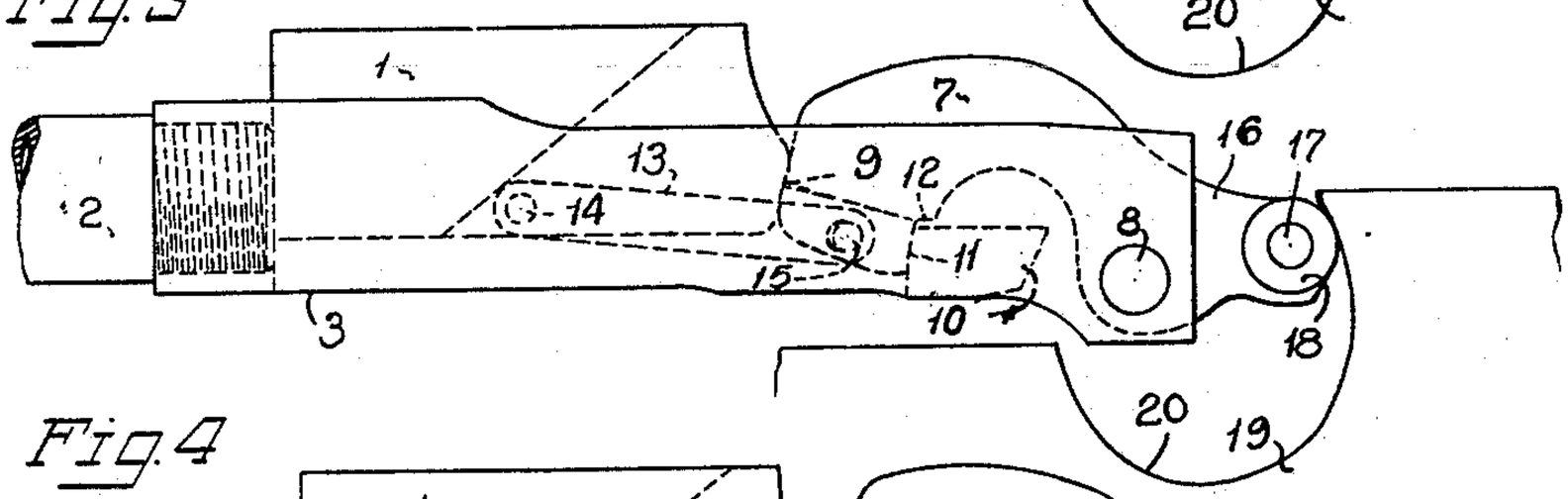


Fig. 4

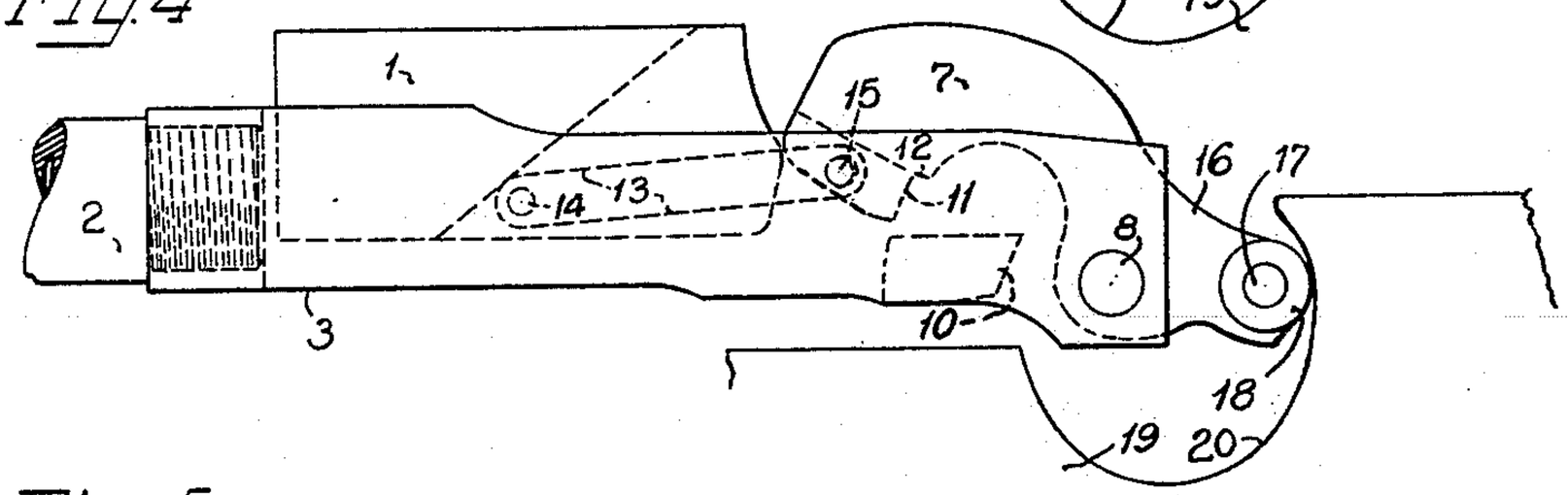
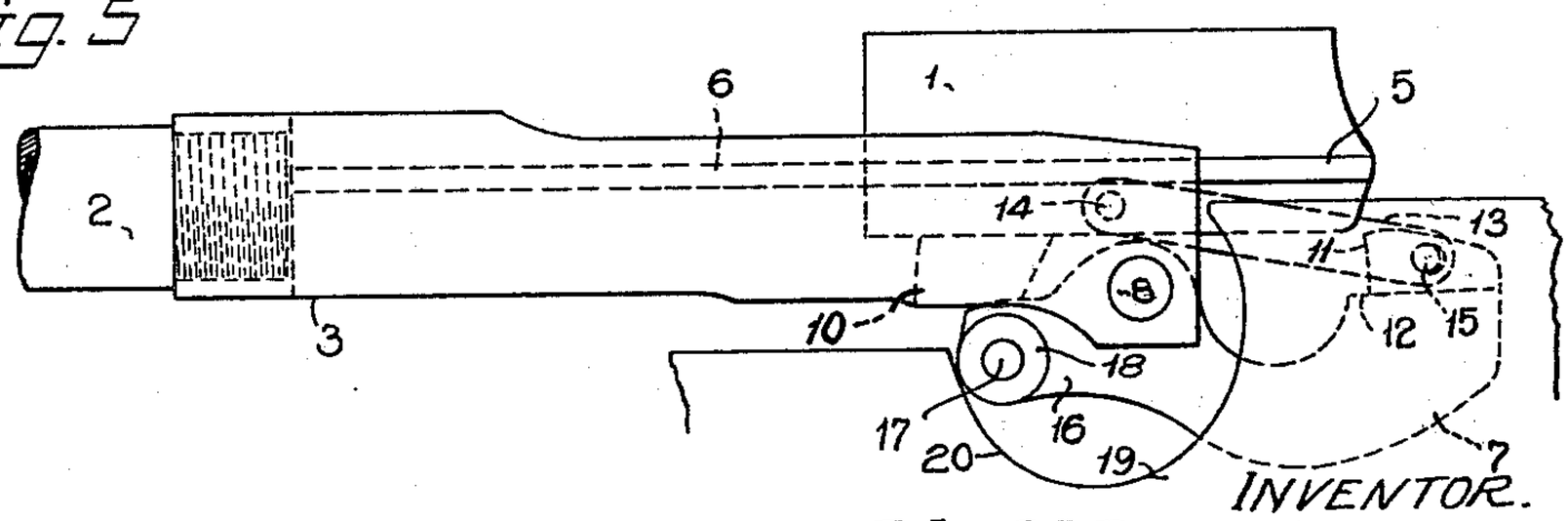


Fig. 5



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Patented Apr. 14, 1931 1,801,070

UNITED STATES PATENT OFFICE

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BREECH MECHANISM FOR FIREARMS

Application filed June 12, 1929. Serial No. 370,324.

The invention is applicable to firearms generally and more particularly to firearms of the class wherein the barrel and barrel extension and also the breech slide or bolt move rearward upon recoil to a limited extent, and wherein the breech bolt is then permitted to move rearward separately from the barrel and barrel extension and to a greater extent, being returned to its forward locked position automatically.

In firearms of the class referred to it is known practice to provide toggle links for locking the breech bolt in its firing position and further to provide means operative upon recoil for breaking the toggle to permit the breech bolt to move rearward. Such toggle link mechanisms are objectionable, as they involve the transmission of the recoil pressure through two separate links and through three separate pivotal connections. In accordance with the present invention the objections incident to the earlier mechanisms are avoided by providing a single pivoted lock link or bolt which directly engages the breech bolt to normally hold it in firing position. Upon recoil the lock bolt is automatically moved out of obstructive relationship with the breech bolt, and there is preferably provided a connecting means between the breech bolt and the lock bolt for transmitting motion from the former to the latter. The said connecting means, however, is normally so positioned as to be incapable of moving the lock bolt.

In the accompanying drawing there is shown a diagrammatic embodiment of the invention, but it will be understood that the drawing is for illustrative purposes only and is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing:

Fig. 1 is a plan view, largely diagrammatic, of a barrel extension, breech bolt and breech mechanism embodying the invention.

Fig. 2 is a side view of the parts shown in Fig. 1, the said parts being shown in their forward firing positions.

Fig. 3 is a view similar to Fig. 2, but showing the parts moved rearward to the position where the unlocking action of the breech mechanism begins.

Fig. 4 is a view similar to Fig. 2, but showing the parts in intermediate positions.

Fig. 5 is a view similar to Fig. 2, but showing the parts in the positions of complete recoil.

Referring to the drawing, 1 represents a breech slide or bolt which normally closes the rear end of the barrel 2 as shown in Figs. 1 and 2, but which is movable rearward relatively to the barrel during the recoil action of the firearm. There is also provided a barrel extension 3 which is connected with the barrel 2, the said barrel extension and barrel preferably being movable rearward to a limited extent upon recoil following the discharge of the firearm. The breech bolt 1 is suitably guided between the side walls 4, 4 of the barrel extension 3 for rearward movement as stated, being provided at its sides with tongues 5, 5 which enter grooves 6, 6 in the said side walls.

The breech bolt 1 is normally held in its forward locked position by means of a locking bolt 7 which is pivotally mounted at the rear thereof for movement about a transverse horizontal axis. This pivotal axis is preferably out of the path of rearward movement of the breech bolt. When the barrel extension and breech bolt are both movable rearward, as is preferred, the bolt 7 is pivoted to the barrel extension. As shown there is a transverse pivot pin 8 which extends through the bolt 7 and through the side walls 4, 4 of the barrel extension.

When the parts are in normal positions as shown in Fig. 2, the breech bolt 7 directly engages at its front with the rear end of the breech bolt at 9 and serves to firmly lock the breech bolt against rearward movement relatively to the barrel extension. The rearward thrust on the breech bolt, resulting from the discharge of the firearm, is transmitted directly to the lock bolt. This thrust may be taken entirely upon the pivot pin 8, but it is usually desirable to provide additional means for taking a part of the thrust and for thus assisting in resisting the rearward pressure exerted on the lock bolt by the

breech bolt. I have shown such additional means in the form of an abutment 10 which extends transversely between the two side walls 4, 4 of the barrel extension and which is positioned to be engaged by a shoulder 11 on the lock bolt. The engaging surfaces of the abutment 10 and the shoulder 11 are preferably concentric with the pivotal axis of the bolt at 8.

Preferably, the engaging surfaces of the lock bolt 7 and the breech bolt 1, as shown at 9 in Fig. 2, are not concentric with the pivotal axis at 8, but are at a slight angle to a concentric arc as clearly indicated. Thus when the lock bolt 7 is moved downward, there is a wedging action between the surfaces at 9 and the concentric surface on the abutment 10. This wedging action serves to force the breech bolt forward to its extreme position and further serves to limit downward movement of the lock bolt. Should this wedging action fail, by reason of wear or otherwise, to limit the downward movement of the lock bolt, a shoulder 12 on the said bolt is positioned to engage the upper surface of the abutment 10 and thus positively limit the movement.

There is provided a connecting means between the breech bolt and the lock bolt which is normally inoperative, but which upon recoil automatically becomes operative to pivotally move the lock bolt out of its locking or obstructive relationship with the breech bolt. Preferably this connecting means is a link 13 pivotally connected with the breech bolt 1 with the lock bolt 7. This link 13 is preferably centrally located, being pivoted to the breech bolt 1 by means of a pivot pin at 14 and being pivoted to the lock bolt 7 by means of a pivot pin at 15. At least one of the link bearings, as for instance that at 15, has sufficient play to prevent the transmission of any pressure through the said link 13 when the parts are in normal position, the construction being intentionally such that all pressure will be transmitted directly through the engaging surfaces at 9 as already described.

There is provided a suitable means operative upon recoil to render the connecting means operative for the purpose described. When the said means is a link such as 13, the said link is automatically moved about its pivotal connection with the breech bolt to a position enabling it to transmit pressure from the breech bolt to the lock bolt so as to move the latter out of its obstructive relationship. When the connecting link and lock bolt are pivotally connected with each other as shown, this upward movement of the connecting link may be effected by giving the lock bolt an initial upward movement toward a position out of its locking or obstructive relationship with the breech bolt 1. It will be obvious from an inspection of Fig. 4 that as soon as the lock bolt has been swung upward to a slight extent, the angular position of the operating link 13 is changed and that any lost motion in the bearings of the said link 13 is taken up. The recoil action of the breech bolt is then transmitted through the link 13 to move or at least assist in moving the lock bolt to a position entirely out of the path of the breech bolt as shown in Fig. 5.

When the barrel and barrel extension move rearward to a limited extent upon recoil, as is preferred, advantage is taken of this movement to relatively move the lock bolt to effect unlocking. The particular means whereby this result is obtained may be varied but as shown the lock bolt is provided with a rearward extension or arm 16 carrying a transverse bearing pin 17 on which are mounted rollers 18, 18. Two cam plates 19, 19 are provided in relatively fixed positions on the main frame of the firearm, and each of these two plates 19, 19 is provided with a cam surface 20 in position for engagement by the corresponding roller.

Preferably there is an initial combined rearward movement of the barrel extension and breech bolt in fixed relationship with each other, the parts moving rearward from the position shown in Fig. 2 to the position shown in Fig. 3. As soon as the position shown in Fig. 3 is reached, the rollers 18, 18 engage the cam surfaces at 20 and the lock bolt is forced to turn in the clockwise direction, the rear arm 16 thereof moving downward and the front end moving upward. As the front end of the lock bolt moves upward, the angular position of the operating link 13 is changed, and thereupon the recoil action of the breech bolt is transmitted through the link 13 to assist in the upward and rearward movement of the lock bolt. The action of the cams upon the rollers 18, 18 is combined with the thrust through the link 13 to continue the movement of the lock bolt in the clockwise direction, the parts finally reaching the relative positions as shown in Fig. 5 which is the fully recoiled position. It will be observed that the arm 16 engages the bottom of the abutment 10 to prevent any relative movement beyond the position shown in Fig. 5.

In accordance with customary practice, the breech bolt is properly biased, as for instance by a spring (not shown), for forward return movement to its normal locked position as shown in Fig. 1. It will be understood that during return movement the motions heretofore described are reversed, the parts passing through the position shown in Fig. 4, then through the position shown in Fig. 3 and finally reaching the position shown in Fig. 2.

What is claimed is:

1. In a breech mechanism for a firearm, the combination of a breech bolt movable

rearward upon recoil, a lock bolt pivoted behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement, means operative upon recoil to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt, and a connecting means operative after the said initial movement of the lock bolt and serving as the result of the recoil action of the breech bolt to continue the said movement of the lock bolt.

2. In a breech mechanism for a firearm, the combination of a breech bolt movable rearward upon recoil, a lock bolt pivoted behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement, a connecting link pivotally connected with the lock bolt and the breech bolt respectively and normally inoperative to pivotally move the lock bolt as the result of rearward pressure transmitted from the breech bolt, and means operative upon recoil to move the connecting link about its pivotal connection with the breech bolt to a position enabling it to move the lock bolt out of obstructive relationship with the breech bolt.

3. In a breech mechanism for a firearm, the combination of a breech bolt movable rearward upon recoil, a lock bolt pivoted behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement, a connecting link pivotally connected with the lock bolt and the breech bolt respectively and normally inoperative to pivotally move the lock bolt as the result of rearward pressure transmitted from the breech bolt, and means operative upon recoil to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt and to thus move the connecting link to a position enabling it to continue the said movement of the lock bolt as the result of the recoil action of the breech bolt.

4. In a breech mechanism for a firearm, the combination of a breech bolt movable rearward upon recoil, a pivoted lock bolt normally directly engaging the breech bolt to obstruct rearward movement, the pivotal axis of the lock bolt being behind the normal position of the breech bolt and out of the path of rearward movement thereof, means operative upon recoil to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt, and a connecting means operative after the said initial movement of the lock bolt and serving as the result of the recoil action of the breech bolt to continue the said movement of the lock bolt to a position permitting the rear portion of the breech bolt to move rearward beyond the said pivotal axis.

5. In a breech mechanism for a firearm, the combination of a breech bolt movable rearward upon recoil, a pivoted lock bolt normally directly engaging the breech bolt to obstruct rearward movement, the pivotal axis of the lock bolt being behind the normal position of the breech bolt and below the path of rearward movement thereof, means operative upon recoil to initially move the lock bolt upward about its pivot toward a position out of obstructive relationship with the breech bolt, and a connecting means operative after the said initial movement of the lock bolt and serving as the result of the recoil action of the breech bolt to continue the said movement of the lock bolt upward and rearward to a position permitting the rear portion of the breech bolt to move rearward beyond the said pivotal axis.

6. In a breech mechanism for a firearm, the combination of a breech bolt movable rearward upon recoil, a lock bolt pivoted behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement, an abutment mounted in fixed relation to the axis of the lock bolt pivot and engaging a shoulder on the lock bolt to resist rearward pressure on the said lock bolt, means operative upon recoil to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt and out of engagement with the abutment, and a connecting means operative after the said initial movement of the lock bolt and serving as the result of the recoil action of the breech bolt to continue the said movement of the lock bolt.

7. In a breech mechanism for a firearm, the combination of a breech bolt movable rearward upon recoil, a lock bolt pivoted behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement, an abutment mounted in fixed relation to the axis of the lock bolt pivot and engaging a shoulder on the lock bolt to resist rearward pressure on the said lock bolt, a connecting link pivotally connected with the lock bolt and the breech bolt respectively and normally inoperative to pivotally move the lock bolt as the result of rearward pressure transmitted from the breech bolt, and means operative upon recoil to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt and to thus move the connecting link to a position enabling it to continue the said movement of the lock bolt as the result of the recoil action of the breech bolt.

8. In a breech mechanism for a firearm, the combination of a breech bolt movable rearward upon recoil, a lock bolt pivoted behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement, the surfaces of engagement be-

tween the lock bolt and breech bolt being at an angle to an arc concentric with the axis of lock bolt movement so as to provide a wedging action as the said bolt moves into its locking position, means operative upon recoil to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt, and a connecting means operative after the said initial movement of the lock bolt and serving to continue the said movement of the lock bolt as the result of the recoil action of the breech bolt.

9. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, means operative upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt, and a connecting means operative after the said initial movement of the lock bolt and serving as the result of the recoil action of the breech bolt to continue the said movement of the lock bolt.

10. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, a connecting link pivotally connected with the lock bolt and the breech bolt respectively and normally inoperative to pivotally move the lock bolt as the result of rearward pressure transmitted to the link from the breech bolt, and means operative upon the combined rearward recoil movement of the barrel extension and breech bolt to move the connecting link about its pivotal connection with the breech bolt to a position enabling it to move the lock bolt out of obstructive relationship with the breech bolt.

11. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, a connecting link pivotally connected with the lock bolt and the breech bolt respectively and normally inoperative to pivotally move the lock bolt as the result of rearward pressure transmitted to the link from the breech bolt, and means operative upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt and to thus move the connecting link to a position enabling it to continue the said movement of the lock bolt as the result of the recoil action of the breech bolt.

12. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, the pivotal axis of the lock bolt being behind the normal position of the breech bolt and out of the path of rearward movement thereof, means operative upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt, and a connecting means operative after the said initial movement of the lock bolt and serving as the result of the recoil action of the breech bolt to continue the said movement of the lock bolt to a position permitting the rear portion of the breech bolt to move rearward relatively to the barrel extension to a position beyond the said pivotal axis.

13. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, an abutment fixedly mounted on the barrel extension and engaging a shoulder on the lock bolt to resist rearward pressure on the said lock bolt, means operative upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt, and a connecting means operative after the said initial movement of the lock bolt and serving as the result of the recoil action of the breech bolt to continue the said movement of the lock bolt.

14. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, an abutment fixedly mounted on the barrel extension and engaging a shoulder on the lock bolt to resist rearward pressure on the said lock bolt, a connecting link pivotally connected with the lock bolt and the breech bolt

respectively and normally inoperative to pivotally move the lock bolt as the result of rearward pressure transmitted to the link from the breech bolt, and means operative upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt and to thus move the connecting link to a position enabling it to continue the said movement of the lock bolt as the result of the recoil action of the breech bolt.

15. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, an arm extending rearward from the lock bolt, means engaging said arm and operative upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt, and a connecting means operative after the said initial movement of the lock bolt and serving as the result of the recoil action of the breech bolt to continue the said movement of the lock bolt.

16. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, a connecting link pivotally connected with the lock bolt and the breech bolt respectively and normally inoperative to pivotally move the lock bolt as the result of rearward pressure transmitted to the link from the breech bolt, an arm extending rearward from the lock bolt, and means engaging said arm and operative upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the lock bolt about its pivot toward a position out of obstructive relationship with the breech bolt and to thus move the connecting link to a position enabling it to continue the said movement of the lock bolt as the result of the recoil action of the breech bolt.

17. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, a cam fixed against recoil movement and cooperative with the lock bolt upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the said bolt about its pivot toward a position out of obstructive relationship with the breech bolt and a connecting means operative after the said initial movement of the lock bolt and serving to continue the said movement of the lock bolt as the result of the recoil action of the breech bolt.

18. In a breech mechanism for a firearm, the combination of a barrel extension movable rearward upon recoil, a breech bolt movable rearward upon recoil, a lock bolt pivoted to the barrel extension behind the breech bolt and normally directly engaging the breech bolt to obstruct rearward movement thereof relatively to the barrel extension, a connecting link pivotally connected with the lock bolt and the breech bolt respectively and normally inoperative to pivotally move the lock bolt as the result of rearward pressure transmitted to the link from the breech bolt, an arm extending rearward from the lock bolt, and a cam fixed against recoil movement and cooperative with the said arm upon the combined rearward recoil movement of the barrel extension and breech bolt to initially move the said bolt about its pivot toward a position out of obstructive relationship with the breech bolt and to thus move the connecting link to a position enabling it to continue the said movement of the lock bolt as the result of the recoil action of the breech bolt.

In testimony whereof I have hereunto set my hand this 31 day of May, 1929.

JOHN BROWNING,
Administrator of the Estate of John M. Browning, Deceased.