lock the bolt, and the parts of the firearm in fired and uncocked condition;

FIG. 4 is a fragmentary cross-sectional view in side elevation, with the parts in the same latched and cocked condition as in FIG. 1;

FIG. 5 is a view similar to FIG. 4, but showing the firing pin in a fired position, and the latch mechanism is an unlatched position; and

FIG. 6 is a view similar to FIGS. 4 and 5, but showing the firing pin in a cocked position, and the latch mechanism detented in a disabled position.

The improved bolt latch mechanism is broadly applicable to bolt-action firearms of various designs, but is shown for purposes of illustration in a bolt-action rifle of substantially the same type as is shown in more detail in U.S. Pat. Nos. 2,585,195 to Walker and 2,514,981 to Walker et al, which were assigned to the owner of the present application. The rifle includes a hollow cylindrical bolt 10 which is mounted for rotation and longitudinal reciprocation in a receiver (not shown), by means of a handle 12 brazed or otherwise secured to the bolt. The bolt, when closed against the breech of the rifle barrel, may be locked by means of conventional lugs formed on its forward end (not shown), which are engaged by rotating the handle down into the position shown in FIGS. 1 and 2, or unlocked by raising the handle to the position of FIG. 3. The bolt is shown in its closed longitudinal position wih respect to elements of a fire control mechanism which includes a sear 34 and a trigger 35. With the bolt turned to its unlocked position of FIG. 3, it may be pulled longitudinally to the left to open the action for loading and unloading cartridges, and for cocking a firing pin 24.

A bolt plug 16 has a threaded extension 18 which extends forwardly into threaded engagement with internal threads 14 formed in the bolt, thus drivingly connecting the bolt and bolt plug for joint longitudinal reciprocation, but permitting the bolt to rotate independently. The bolt plug is formed with recessed flats 19 for sliding engagement with mating surfaces formed on the receiver (not shown), to restrain the bolt plug from rotating with the bolt. The bolt plug also has a cylindrical recess 20 slidably receiving an enlarged head 26 of the firing pin 24, and a slot 22 through which a sear-engaging lug 28 and a cocking arm 30 of the firing pin extend in freely-slidable but non-rotatable relation.

In the relative positions of these elements shown in FIGS. 1 and 4, the firing pin 24 is cocked, with an oblique face 42 of the lug 28 bearing against a mating face 40 of the sear 34. The firing pin is continuously urged toward a firing position, that is, toward the right in the drawings, by a conventional firing pin spring contained within the bolt. The sear, pivoted on a pin 36, is held in its illustrated angular position by the engagement between a step 39 in the sear and a connector 37 attached to the trigger 35, thereby restraining the firing pin in its cocked position. To fire the weapon, the trigger is pulled to move the connector 37 to the position shown in FIG. 3. The angle of the faces 40 and 42 with respect to the longitudinal axis of the bolt and firing pin is such that the firing pin spring exerts a downward component of force on the sear that overcomes the upward force exerted by a sear spring 33, and pivots the sear counterclockwise to the position shown in FIG. 3, permitting the firing pin to be driven forwardly to its fired position shown in FIG. 5.

In the fired condition, the cocking arm 30 of the firing pin extends forwardly into the deepest part of a cocking cam 32 cut into the bolt 10, which is circumferentially aligned with the cocking arm when the bolt is closed (compare FIGS. 1 and 3). After firing, raising the bolt handle to the position of FIG. 3 causes the cocking arm to ride along the curved surface of the cam 32, and retracts the firing pin back toward the cocked position. Then as the bolt is opened and re-closed by a reciprocating movement along its major axis, the lug face 42 engages against the re-elevated sear face 40 and retains the firing pin in the cocked condition of FIGS. 1 and 4 once more.

The firearm action thus far described is conventional in design, and is further illustrated and described in the aforementioned U.S. Pat. Nos. 2,585,195 and 2,514,981. Therefore, no further detailed description of its operation and design is believed necessary. A safety mechanism of any type suitable to such an action may be utilized as desired, and the bolt latch of the present invention is intended to operate entirely independently of the safety mechanism. As illustrated, the sear 34 is provided with a cam lobe 38 for cooperation with a safety lever having an eccentric, of the kind disclosed in U.S. Pat. No. 2,514,981, which is selectively operable to block the sear against movement from the cocked position of FIG. 1. This is intended merely as an illustrative example of various safety mechanisms that might by used in conjunction with the improved bolt latch, which will now be described.

The bolt plug 16 is formed with a radially-extending recess 50, in which a latch lever 51 is pivotally supported on a pin 60 received in a tranverse hole 58. The lever 51 has a tooth 52 at its forward end, which, in a latched position of FIGS. 1 and 4, engages in a locking notch 62 at the rear of the bolt 10 and handle 12 to prevent the bolt from being moved from its closed and locked position. A plunger 68 is slidably received in a blind hole 64 in the bolt plug, and is urged against a rear face 53 of the lever 51 by a spring 66 to bias the lever in a clockwise direction toward the latched position.

The latch lever 51 is formed with a planar cam surface 55 which projects into the recess 20 in the latched position of FIG. 4, into the path of movement of the outer cylindrical surface of the firing pin head 26 from its cocked position of FIG. 4 to its fired position of FIG. 5. In the latched position, the cam surface 55 extends in a direction inclined downwardly in a forward direction with respect to the longitudinal axis A of the firing pin motion. When the trigger 35 is pulled to release the firing pin, the forwardly-moving cylindrical head 26 engages the cam surface 55 and pivots the lever 51 to the unlatched position shown in FIG. 5, against the bias of the spring-loaded plunger 68. The bolt 10 is now free to turn, and may be unlocked and opened. The surface 55 continues to be inclined downwardly in a forward direction, for a reason which will appear, but at a greatly reduced angle to the bolt axis A.

Re-cocking of the firing pin 24 frees the cam surface 55 from the head 26. This allows the plunger 68 to automatically re-latch the lever 51 in the position of FIG. 4, as the bolt handle is closed and the locking notch 62 becomes aligned with the tooth 52.

In the illustrated embodiment, the rear face 53 of the latch lever is formed with a detent notch 70, which is not reached by the plunger 68 sliding along the face 53 during the pivotal movements of the lever between the latched position of FIG. 4 and the unlatched position of FIG. 5. However, the lever may be rocked, by applying finger pressure to a projecting V-shaped upper surface