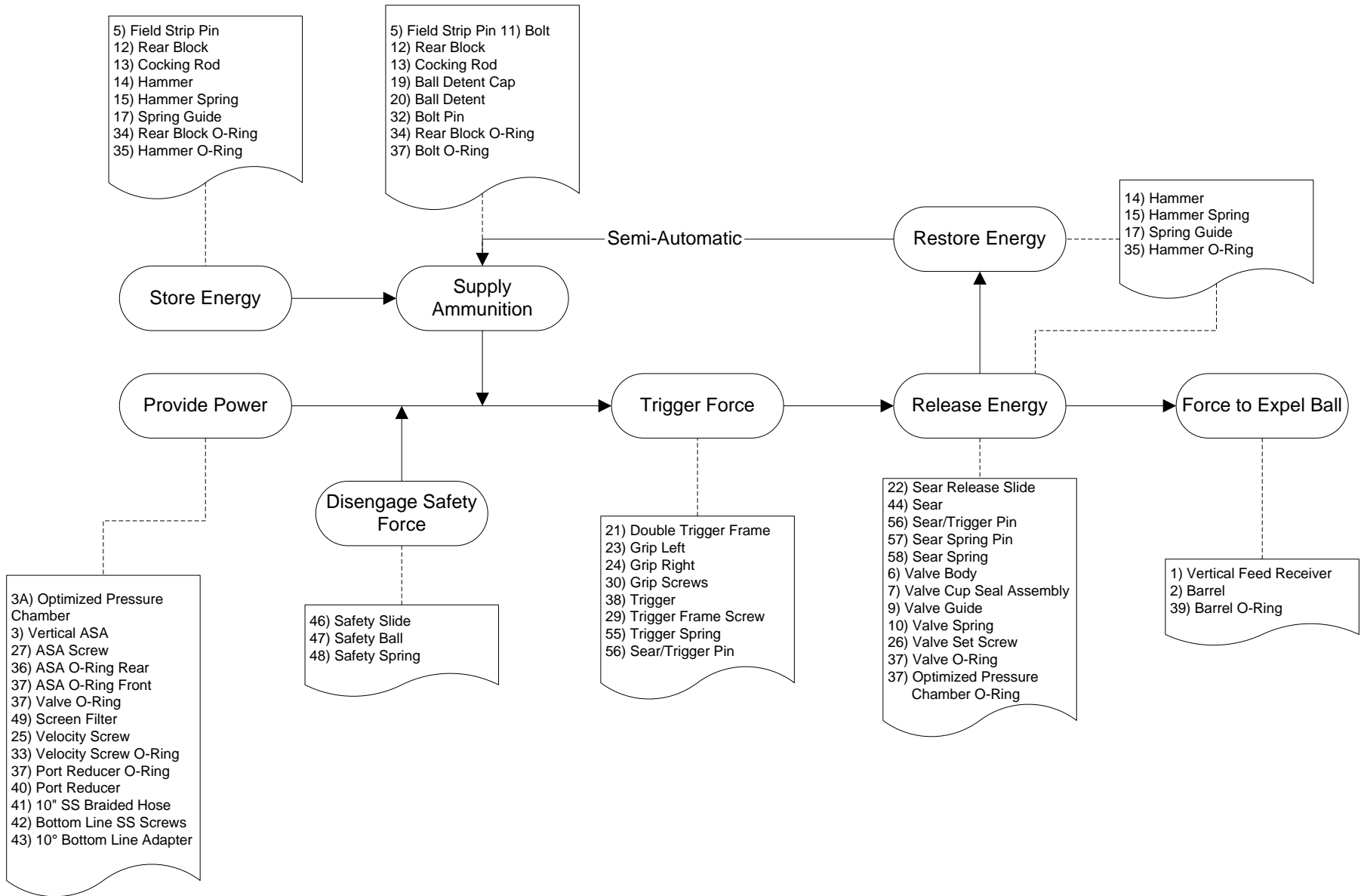


# FUNCTION DIAGRAM



The function diagram shows that the primary function of our paintball gun is to propel a paintball from the barrel. The function structure has been included in the function diagram to easily show which parts of the paintball gun carry out each function. The general outline of the functional diagram will not be modified because we are not planning on changing how the pressure is used to fire the ball. Instead we have focused on reducing the number of parts and making the gun more ergonomically friendly. We have developed detailed definitions for each subsystem of the function diagram, as follows:

**Provide Power:** The main power in this paintball gun is obtained from a CO<sub>2</sub> tank currently attached to the 10" bottom line adapter (#43).

**Store Energy:** Each time the gun is used after the CO<sub>2</sub> tank is attached, it must be initially cocked by the user by pulling back the cocking rod (#13), this depresses the hammer spring (#15) and the gun is ready to shoot. The CO<sub>2</sub> pressure inside of the tank flows through the braided hose (#41) and vertical ASA (#3) but is contained by the valve (#6). The CO<sub>2</sub> pressure will then re-cock the gun after each shot.

**Supply Ammunition:** The paintballs are held inside the hopper, shown in Figures 1.1 and 1.2 on page 3. The paintballs are gravity fed into the vertical feed receiver (#1) and held in place by the ball detent (#20) until expulsion from the barrel. By cocking the gun, the bolt (#11) is pulled back, along with the hammer (#14), allowing the next paintball to fall into place.

**Disengage Safety Force:** When the gun is not in use the safety switch (#46) should be engaged, when ready to fire the user must disengage the switch.

**Trigger Force:** The gun is ready to fire and when the user finds his target he must now pull the trigger (#38) to fire the paintball.

**Release Energy:** The depression of the trigger causes the sear (#44) to pivot. The pivot of the sear releases the hammer spring (#15) which propels the hammer (#14) forward through the cylinder. The force of the released hammer strikes the valve cup seal (#7) which opens the valve and releases the pressure to the cylinder.

**Force to Expel Ball:** The pressure then goes to two places; the first place is up through a hole behind the paintball where the bolt is shaped to guide the pressure correctly around the paintball for a clean fire. The pressure sends the paintball down the barrel and towards the target.

**Restore Energy:** The pressure also goes back towards the hammer, to re-cock the gun, this happens due to the force of the pressure which pushes the hammer back into locked position. The result of the pressure pushing the hammer back is that the hammer spring becomes depressed again, just as in the initial cocking of the gun by the user. The gun is once again ready to fire.