To all whom it may concern:

Be it known that we, JOHN F. MEIGS and ROBERT P. STOUT, citizens of the United States, and residents of South Bethlehem, Northampton county, State of Pennsylvania, have invented certain new and useful Improvements in Rammers for Guns, and is attached to and moves with the end of the gun 1, and thus always maintains the same relation to the gun in whatever position it happens to be. This rammer frame has curved portions 3 and 4, and a straight end portion 5, which end portion faces the gun and is opposite the center thereof. Within this frame we provide a chain guide which, as shown in Fig. 7, has on opposite sides grooves 6 which receive rollers 7 forming a part of the chain. The chain which moves within the chain guide is made up of flat links pivoted together and having portions on one side which abut when the chain is straight thus preventing flexure in that direction. The chain can thus flex in only one direction. In the preferred form shown in the drawing, each link of the chain is made of two side links 8 having projections 9 at the top which are joined by the rigid cross web 10. The sides of the links are separated by the cylindrical distance pieces 11 constituting the connection for the pivot bolts 12 for uniting adjacent links. The bolts 12 are held in place by pins 13. Alternate links may be made sufficiently wide to embrace the adjoining links, as shown in Fig. 7, or all links may be of the same width and placed staggered. The bolts 12 pass through and support the rollers 7 at the side of the chain. Each link has mounted upon the cross web 10, at the top, a flange or lug 14 upon which slides the bolt 15, this bolt being held in place by means of the grooved plate 16 which fits over the lug 17 on the side of the bolt and which is attached to the cross web 10 in any suitable manner, such as by screws 18. Upon the opposite edge of the cross web 10, there are vertical lugs 19 corresponding in shape to the lug 14 except that they are lower, and portions 20 are cut away. The locking bolt 15 has, on its under surface, a groove 21 which fits over the lug 14 and permits the bolt to slide thereon, and it also has, on its under surface, a groove 22, which is sufficiently deep to embrace the lugs 19. On the side of this bolt, opposite the lug 17, portions 23 are cut away to correspond with the cut away portions 100 between the lugs 19. By this construction the cross webs 10 and vertically projecting lugs thereof upon one link abut the corresponding parts of the adjacent link and the bolt 15 carried upon one edge of one link permits the lugs upon the adjoining link to enter the groove therein, through the cut away portion 23, and the bolt may then be
moved lengthwise until the lugs 24 thereon are opposite the lugs 19 when the links will be locked together so that the chain cannot flex in any direction.

5 Each of the locking bolts 15 carries upon its upper surface a lug 25 which travels in the groove 26 in the surface of the chain guide. It will be noted that this groove 26 is parallel to the side walls of the chain guide at all points except near the end of the rammer arm where, in the straight portion 5 of each arm, it has a portion 27 bent at an angle. The rear straight portion of this groove, extending through the body of the rammer frame 4, 15, 3, 2, Fig. 1, is so located that the lugs 25 hold the bolts 15 to one side, so that the lugs 19 on the cross web 10 are not engaged by the lugs 24 on the bolt, but the lugs on one part are opposite the cut away portions of the other and thus the chain is unlocked and may flex and follow the curvature of the guide. This groove engaging the lug 25 positively holds the locking bolt in its unlocked position. When, however, the link carrying a bolt reaches the bent portion of the groove 27, the lug 25 in following the groove moves the bolt lengthwise and thus brings the lugs 24 opposite the lugs 19 and locks the adjoining links together. It will be noted that this locking action takes place in the straight end portion of the chain guide and that the short straight portion beyond the point where the locking takes place, serves as a support to hold the rigid rammer arm, formed by the interlocked links, in the desired position to enter the rear end of the gun. It will be further observed that applicants' bolts and cooperating lugs constitute independent connections for the various links and that consequently one is not dependent for its effective operation upon the others.

In order to prevent accidental unlocking of the links after they leave the chain guide, we prefer to use a spring for holding the bolt in locking position. In Fig. 3 is shown such a spring 28 mounted within the grooved plate 16 and having one end bearing upon the lug 17 thus tending to force the bolt into locking position at all times. This will prevent unlocking due to shocks and jars. It will be noted, also, that the use of this spring may render unnecessary the two sides to the bent portion 27 of the groove, since the camming action of that bent portion will not be absolutely necessary to force the bolt into locking position, but all that will be necessary is to release the bolt from the restraining action of the straight groove 26 so that the spring may move it. A cam or inclined surface, or other means, however, is necessary upon the return of the chain to the chain guide in order to unlock the bolt automatically and make the lug 25 thereon enter the straight groove 26.

Any suitable means may be used for moving the chain lengthwise of the chain guide so that it will project therefrom as a rammer arm. In the drawings we have shown an electric motor 29 mounted upon the rammer frame 2, and driving the sprocket wheel 30 through a chain of beveled gears. The sprocket wheel 30 is shown at the bend in the chain guide and its teeth engage the cross pieces 11 of the chain links and thus move the chain in one direction or the other as desired. On the outer end of the chain is placed the rammer head 31 which enters the gun.

We believe that the operation of the device and its advantages will be obvious from the above description. Its essential feature is that a single chain may be forced from the open end of a curved guide and will automatically become rigid, not permitting flexure in any direction, just before leaving the guide and will, upon returning to the guide, permit flexure after it has entered therein a short distance.

Having thus described the invention what we claim and desire to secure by Letters Patent is:

1. A rammer composed of chain links, and independent connections for interlocking the links against flexure.

2. A rammer composed of chain links constructed to flex in only one direction, and independent connections for interlocking the adjacent links against flexure.

3. A rammer composed of flat chain links having upon one side portions which abut when the chain is straight thus preventing flexure in that direction, and means for interlocking separately and independently the abutting portions of said links to prevent flexure in the other direction.

4. A rammer composed of flat chain links having upon one side portions which abut when the chain is straight thus preventing flexure in that direction, locking lugs on adjoining edges of said links, and locking bolts adapted to engage said lugs and lock the links against flexure.

5. A rammer composed of flat chain links having upon one side portions which abut when the chain is straight thus preventing flexure in that direction, a locking bolt carried by each link near the end thereof, and lugs upon the adjoining end of the next link adapted to be engaged by said locking bolt.

6. A rammer composed of flat chain links having upon one side portions which abut when the chain is straight thus preventing flexure in that direction, a sliding spring pressed locking bolt carried by each link near the end thereof, and lugs upon the adjoining end of the next link adapted to be engaged by said locking bolt.

7. The combination with a gun, of a rammer frame, a chain guide, a chain in said guide, and means to interlock the links of
said chain separately and independently to form a rammer.

8. The combination with an open ended curved chain guide, of a chain running in said guide, connections adapted to independently interlock adjacent links against flexure, and means in said guide near the end thereof for bringing said locking means into action.

9. The combination with an open ended curved chain guide, of a chain running in said guide, independent connections adapted to interlock adjacent links against flexure, means in said guide near the end thereof for bringing said locking means into action, and means for supporting the rod formed by the interlocked links in fixed position.

10. The combination with a curved chain guide, of a bolt upon the opposite end and only one direction running in said guide, locking lugs and bolts carried by the links of said chain and adapted to interlock in any direction, and means near the end of said guide for moving the bolt transversely of the chain to interlock the links.

11. The combination with a gun, of a rammer frame, an open ended curved chain guide in said frame, a chain running in said guide and carrying upon its end a rammer head, means for independently interlocking the links of said chain against flexure, means near the end of the chain guide for bringing said locking means into play, and means for supporting the rammer formed by the interlocked links.

12. The combination with a gun, of a rammer frame, a curved chain guide in said frame having a straight end portion, a chain running in said guide, locking lugs and sliding bolts for interlocking adjacent links against flexure, and a cam surface in the straight portion of the chain guide for operating said bolts to interlock the links as they pass from the curved portion through the straight portion of the guide.

13. The combination with a gun, of a rammer frame, a curved chain guide in said frame having a straight end portion and being provided in one wall with a longitudinal groove, a flat link chain running in said guide and adapted to flex in only one direction, locking lugs upon one end of each link, a sliding bolt upon the opposite end of each link and adapted to engage the lugs of the adjacent link to lock them against flexure, a lug carried by each bolt adapted to slide in the groove in the wall of the chain guide, a spring tending to keep each bolt in locking position, and a cam surface in the straight portion of the guide and constituting an extension of the groove adapted to operate the bolts to lock the links when they move in one direction and unlock them when they move in the opposite direction.

14. The combination with a gun, of a rammer frame, a curved chain guide in said frame having a straight open ended portion and being provided throughout the curved portion with a longitudinal groove and in the straight portion with a continuation of said groove bent at an angle thereto, a chain adapted to flex in only one direction running in said guide, bolts for locking the chain against flexure carried by the links of the chain, and lugs on said bolts adapted to slide in the groove in the guide whereby the links of the chain are locked against flexure in the straight portion of the guide and are unlocked in the curved portion thereof.

15. A chain made up of double links having cross webs at the top which abut when the chain is straight, locking lugs extending upwardly from one edge of each link, and a locking bolt carried upon the other edge and adapted to engage the locking lugs of the adjacent link and thereby lock the links together, pivot pins connecting adjacent links, and rollers carried by said pins at both sides of the double links.

16. A chain made up of double links having cross webs at the top which abut when the chain is straight, locking lugs extending upwardly from one edge of each link, a locking bolt carried upon the other edge and adapted to engage the locking lugs of the adjacent link and thereby lock the links together, pivot pins connecting adjacent links, and rollers carried by said pins at both sides of the double links.

17. The combination with an open ended chain guide, of a chain within said guide, means for moving the chain lengthwise within in the guide, and means for automatically and independently locking the links against flexure as they pass toward the open end of the guide and for unlocking them as they pass in the reverse direction.

18. A rammer composed of chain links constructed to flex in a single plane, and locking mechanism having elements movable transversely of the plane of flexure for interlocking the links against flexure.

19. A rammer composed of links pivotally secured together at their ends so as to flex in a single plane, abutments on one side of said pivotal connection in such position as to make contact when the chain is straight, and interlocking mechanism on the other side of said pivotal connection movable transversely of the plane of flexure for locking together adjacent links.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN F. MEIGS.
ROBERT P. STOUT.

Witnesses:
EDWIN A. MILLER,
NORA G. CASEY.