Feb. 9, 1926. 1,572,450

C. G. SWEBILIUS

AUTOMATIC RIFLE

Original Filed May 15, 1919 5 Sheets-Sheet 1

Fig. 1

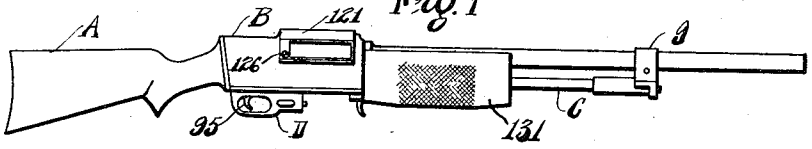


Fig. 2

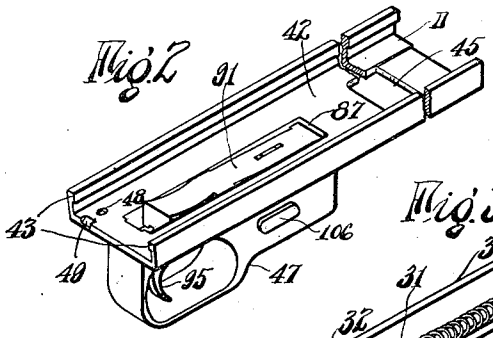


Fig. 3

Fig. 4

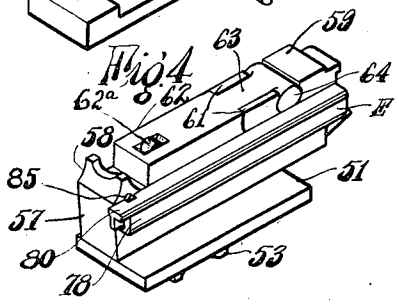


Fig. 5

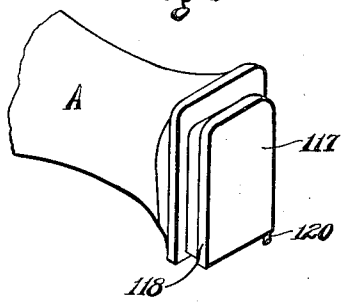
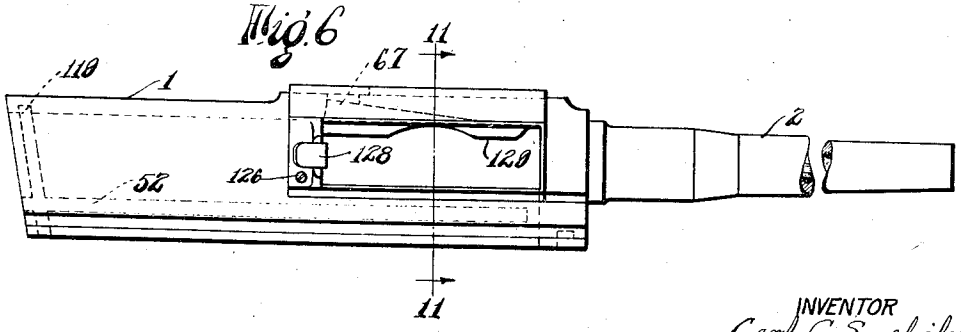


Fig. 6



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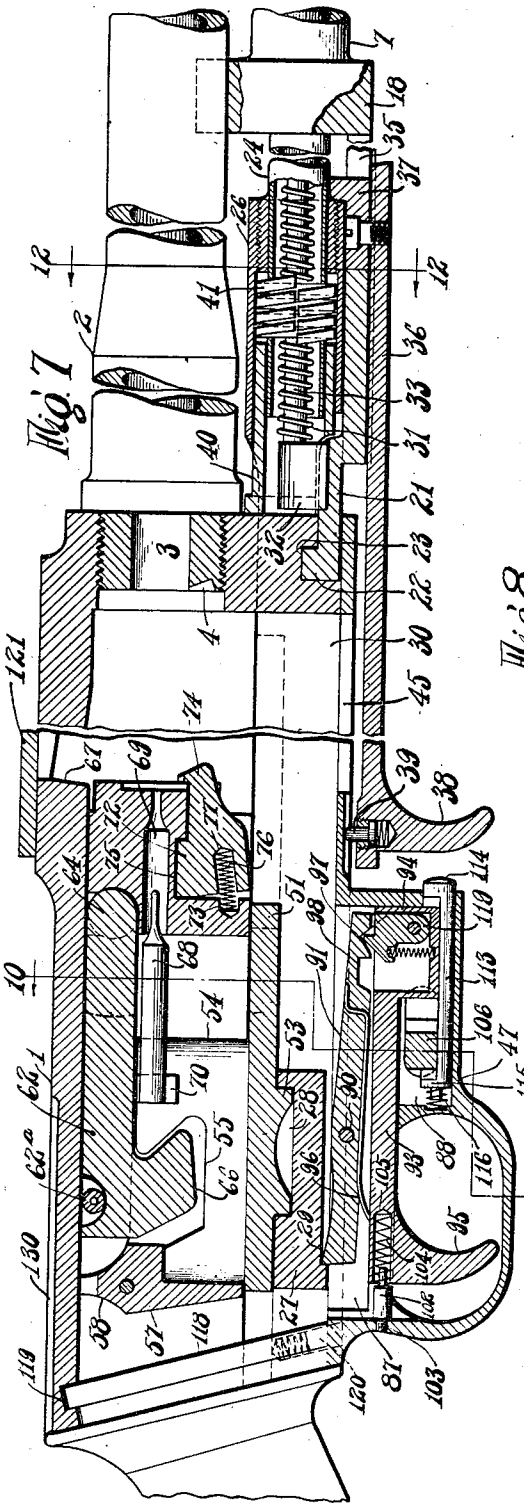
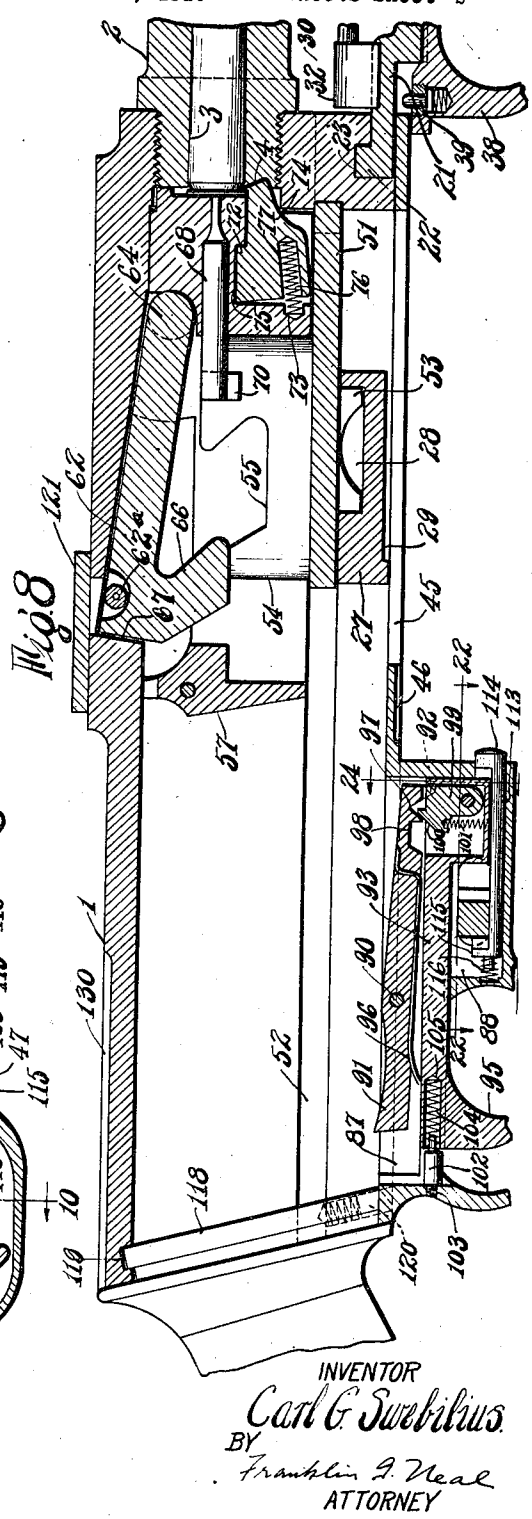
AUTOMATIC RIFLE

Original Filed May 15, 1919 5 Sheets-Sheet 2





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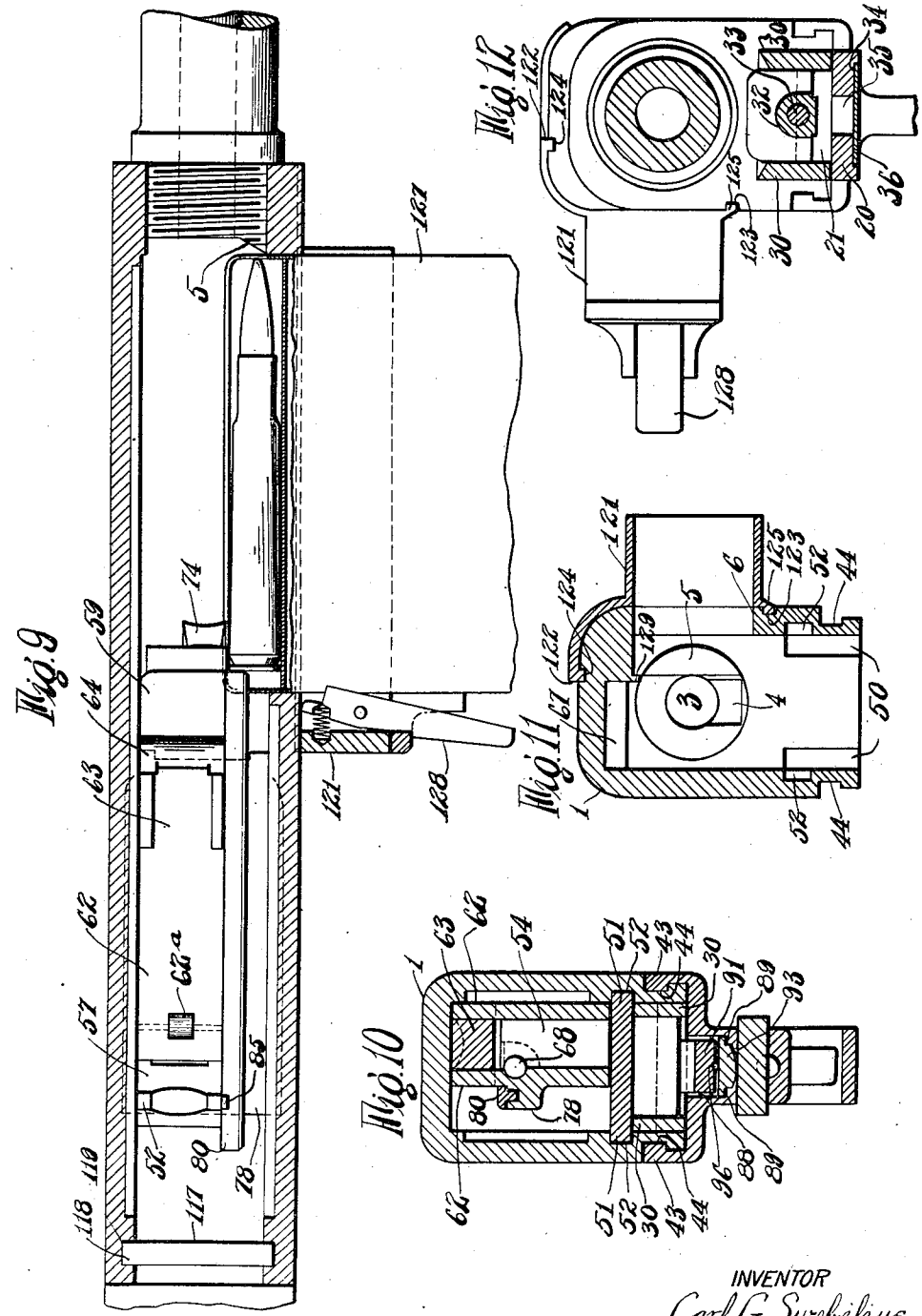
AUTOMATIC RIFLE

Original Filed May 15, 1919 5 Sheets-Sheet 3



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AUTOMATIC RIFLE

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Fig. 13

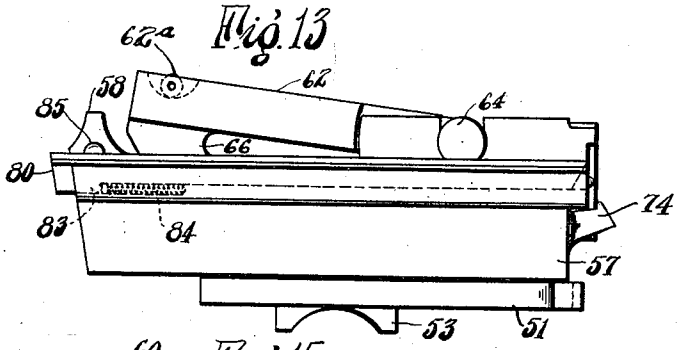


Fig. 14

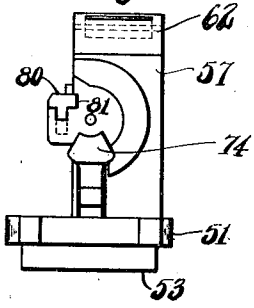


Fig. 15

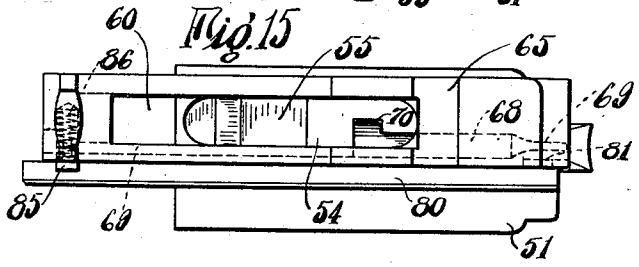


Fig. 16

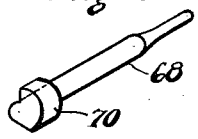


Fig. 17

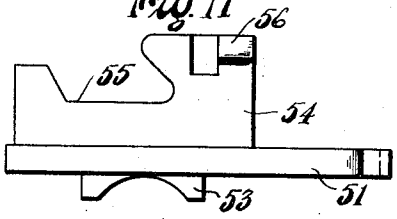


Fig. 18

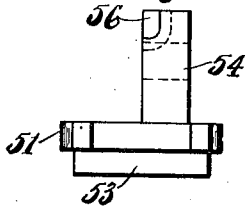


Fig. 19

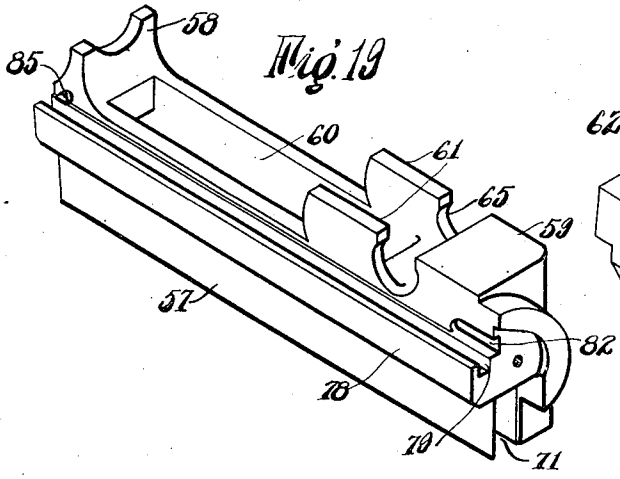
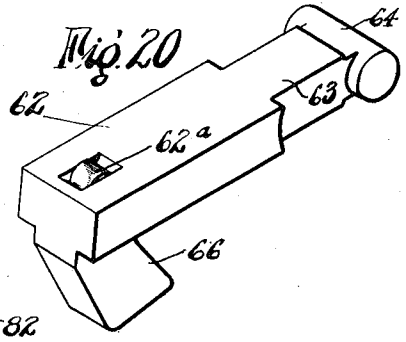


Fig. 20



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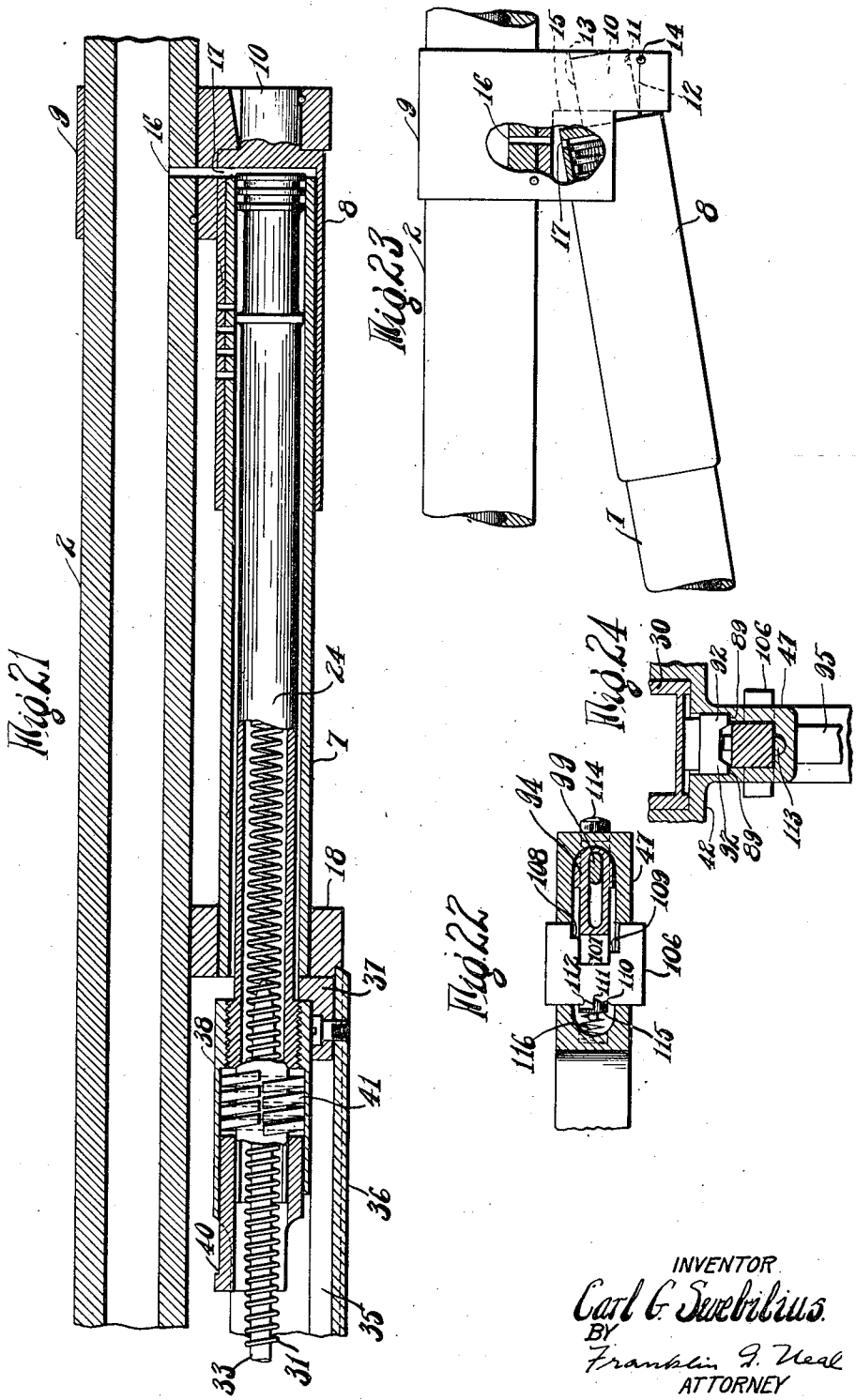
AUTOMATIC RIFLE

Original Filed May 15, 1919 5 Sheets-Sheet 5



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Patented Feb. 9, 1926. 1,572,450

UNITED STATES PATENT OFFICE.

CARL GUSTAF SWEBILIUS, OF NEW HAVEN, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MARLIN FIREARMS CORPORATION, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF DELAWARE.

AUTOMATIC RIFLE.

Application filed May 15, 1919, Serial No. 297,201. Renewed November 17, 1925.

To all whom it may concern:

Be it known that I, CARL GUSTAF SWEBILIUS, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Automatic Rifles, of which the following is a specification.

This application is a continuation in part of my application filed January 24, 1919, Serial No. 272,846.

This invention relates generally to firearms, and is directed more especially to that type of firearm wherein all operations of the mechanism thereof, except that of the trigger, are automatically effected. As a specific embodiment of the invention there is herein disclosed a machine rifle of the gas-operated type, capable of using highly-charged ammunition, so designed that the gun may be operated by the gunner either in prone position or standing and supporting the rifle with his hands only, or with his hands and shoulder.

One object of this invention is the provision of an automatic firearm simple in construction and highly efficient, in which the construction and arrangement of the elements is such that each element is easily and quickly available without the use of tools other than a nail or the like.

This invention has for another of its objects such a construction and arrangement of the elements comprising a firearm as will allow the grouping into self-contained units those elements of the gun which intimately coact with each other.

A further object of the invention is the correlation of the above-mentioned units in a gun in such a way that the gun may be quickly and easily taken down for the purpose of cleaning, repairing or inspection, and as easily and quickly reassembled.

Further objects of this invention are a novel combination and arrangement of the elements comprising the breech mechanism, a novel arrangement of the firing mechanism, a novel arrangement of elements for controlling the conditions of firing of the gun, a unique arrangement of the means for operating the breech mechanism, and a new and novelly-arranged buffer to take up the shock of the rearward movement of the action mechanism.

The means for attaching together the various units in cooperative relation to each other constitutes an additional object of this invention.

These objects are attained by virtue of certain features of the invention which combine to make the gun extremely simple in construction, highly efficient in operation, and easy of assembly and disassembly.

Those elements of the gun which directly cooperate with each other are grouped into self-contained coacting units which can be handled independently of the other units, and which can be correlated with such other units to accomplish the assembly of the gun. The elements are so correlated that they may be assembled into units and the units disassembled into the elements without the use of tools other than a nail or the like, except in one or two instances, these exceptions being in the case of certain units which do not need to be disassembled into their elements for ordinary inspection, cleaning and repair.

The units previously mentioned may be termed the receiver unit, the breech unit, the action unit, the firing control unit and the stock unit. The elements composing the receiver unit comprise the receiver proper, open at the bottom and rear end, the barrel, and magazine attaching or supporting means. The breech unit includes a carriage adapted to slide in the receiver, the breech bolt, firing pin, extractor and ejector. The action unit is composed of the gas cylinder, piston, action rod, action spring, and charging slide. The firing control unit comprises a plate adapted to act as the bottom of the receiver, in which is mounted the trigger, sear, and means for regulating the conditions of firing, either automatic or semi-automatic, and for preventing the firing of the gun. The stock unit comprises merely the stock having a suitable head which fits into and closes the rear end of the receiver.

Without the use of any special tools, the breech, firing control and action units may

be easily and quickly assembled from or disassembled into their component elements. The elements of these units are therefore easily available for the purpose of cleaning and repair. The stock and receiver units are composed of stationary parts which, after they have once been assembled, need not be disassembled, as they do not require the attention that the other units do. For this reason the elements composing these two units are joined together in a more permanent manner. The various units are provided with suitable interengaging means so that they may be quickly and easily assembled and held in place by engagement one with the other. These engaging means are so constructed that no tools are needed to assemble the units to form the gun, and that no tools other than a cartridge, nail or other instrument having a pointed or small end are necessary in the disassembling of the gun.

It is particularly advantageous to have the coacting elements grouped into units, as it allows a quicker and easier take down for cleaning and inspection purposes. Furthermore, there is no danger of an element accidentally dropping out and being lost in the taking down of the gun, when the elements are grouped into self-contained units.

Another feature of the invention is the arrangement of the sear, trigger, and the means for controlling the conditions of firing. The sear is pivotally mounted at approximately its center point and is arranged to engage the breech mechanism to retain the same in cocked position. Operatively associated with the sear is reciprocatively mounted a spring-pressed trigger. Interposed between these two members and carried by the sear is a spring which normally holds one end of the sear in position to engage the breech mechanism. On the surface of one end of the sear is a projection, one face of which is oblique and the other face perpendicular to the surface of the sear. In a recess in the corresponding end of the trigger is pivotally mounted, for limited rotation, a dog having a projection extending beyond the surface of the trigger toward the sear, said projection having one face oblique and the other perpendicular to its upper surface. The dog is held against a wall of the recess by means of a spring in such a way as to normally present its oblique face opposed to the oblique face of the projection on the sear. Associated with the trigger is an adjustable stop by means of which the length of the path of reciprocation of the trigger may be varied. In one position the stop prevents any movement of the trigger, thus preventing the tripping of the sear. In such a position the gun is in safety. In the second position of the stop the trigger is free to reciprocate the entire length of its path. In the reciprocation of the trigger the oblique faces of the projections on the sear and the dog contact and exert a camming action which, when the tips of the oblique faces are in alinement, has completely tripped the sear. A further movement of the trigger breaks the contact of the faces and allows the sear to resume its normal position but with the perpendicular faces of the projections opposed to each other. Under the influence of a spring provided for such purpose, the trigger, when released, tends to return to its normal position. The contact of the perpendicular faces of the projections on the sear and dog cause the dog to rotate against the action of its spring until it is wholly contained within the recess. The trigger returns to its normal position without actuating the sear, after which the dog assumes its original position. Thus single-shot or semi-automatic firing is obtained. In the third position of the stop the trigger may be reciprocated through approximately half of its possible path. This reciprocation is sufficient to trip the sear, but insufficient to allow disengagement of the oblique faces. As long as the trigger is held against the stop in its third position, the sear will remain tripped and the gun will fire automatically. The adjustment of the stop is so controlled that the change from automatic to semi-automatic firing and vice versa may be easily made, but the stop cannot be accidentally moved into safety position, although the change from safety to either of the other positions may be made with no more trouble than from automatic to semi-automatic. This feature is of importance in the use for which the gun is intended, namely, warfare.

Another feature of the invention resides in the arrangement of the elements constituting the breech mechanism. This comprises a carriage adapted to reciprocate in the receiver upon which is mounted the breech bolt, the latter being capable of a limited reciprocation relative to the former. On the carriage is a projection which extends into an aperture through the breech bolt, the aperture being closed at the top by a pivotally-mounted locking lever. On the projection and locking lever are coacting cam surfaces which cause an oscillation of the lever upon relative reciprocation of the breech bolt and carriage. The firing pin is seated in a bore extending from the forward wall of the recess through the remainder of the breech bolt, and is provided with a head which seats in a depression in the projection whereby the firing pin reciprocates in unison with the carriage. In a recess in the front of the bolt is pivotally mounted the extractor. The ejector comprises a strip slightly longer than the breech bolt and is

carried in a groove extending along the bolt, the rear end of the ejector extending beyond the rear of the bolt.

The arrangement of the gas cylinder, piston, action slide, action spring and charging slide constitutes another feature of the invention. One end of the action spring extends into the tubular piston while the other end abuts against a head detachably carried by a plate between the arms of the action slide, the plate being joined to the gas cylinder. The charging slide is slidably mounted in this plate and is so placed that it can be equally as well operated with either the right or left hand. This arrangement allows the ejection of the shells through the bottom of the gun instead of from the side—another advantageous feature of this gun.

To assist in keeping the barrel cool and to prevent premature explosion of the cartridge due to the heat in the cartridge chamber, the gun is so arranged that a cartridge is not chambered until after the trigger has been pulled. The normal position of the breech mechanism, when the gun is cocked, is at the rear of the receiver. After the trigger is operated the breech mechanism moves forward, picks up a cartridge and chambers it. Immediately thereafter the firing pin functions and explodes the cartridge. This arrangement materially adds to the efficiency of the gun. The way in which the cartridges are taken from the magazine and chambered is another feature of the invention, this being accomplished in an extremely simple and efficient manner.

Other objects of the invention lie in the structure and arrangement of the elements of the gun as outlined above whereby an extremely simple, efficient and serviceable device is attained.

Still further objects of the invention will become apparent as the description of the device proceeds.

Referring now to the drawings:

Fig. 1 is a side elevation of the assembled gun;

Fig. 2 is a perspective view of the firing control unit;

Fig. 3 is a similar view of the action unit;

Fig. 4 is a like view of the breech unit;

Fig. 5 is a similar view of the stock unit partially broken away;

Fig. 6 is a side elevation of the receiver unit;

Fig. 7 is a longitudinal vertical section through the gun with the parts in cocked position;

Fig. 8 is a similar section through the receiver at the instant of firing;

Fig. 9 is a longitudinal horizontal section with the parts in cocked position, the breech mechanism being shown in plan view;

Fig. 10 is a section on line 10—10 of Fig. 7;

Fig. 11 is a transverse section on the line 11—11 of Fig. 6;

Fig. 12 is a section on line 12—12 of Fig. 7, but with the action rod in its forward position;

Fig. 13 is a side elevation of the breech unit in locked-up position;

Fig. 14 is a front elevation of the breech unit;

Fig. 15 is a plan view of the breech unit with the locking lever removed;

Fig. 16 is a perspective view of the firing pin;

Fig. 17 is a side elevation of the carriage;

Fig. 18 is a front elevation of the carriage;

Fig. 19 is a perspective view of the breech bolt;

Fig. 20 is a similar view of the locking lever;

Fig. 21 is a longitudinal vertical section showing the relation of the action unit to the barrel;

Fig. 22 is a section on line 22—22 of Fig. 8;

Fig. 23 is a side elevation, partly broken away, of the connection between the gas cylinder and the barrel;

Fig. 24 is a section on line 24—24 of Fig. 8.

The specific embodiment of the invention as disclosed, comprises a shoulder gun, the general arrangement of which is clearly set forth in Fig. 1. The stock unit is designated by the reference character A; the receiver unit is shown at B; the action mechanism, the only portion of which is visible in this figure being the gas cylinder, is labeled C; and the firing control unit is designated by D. The breech mechanism E, being within the receiver when the gun is assembled, is not seen in this figure but is clearly disclosed in Fig. 4.

The receiver 1, open at the bottom and rear, carries the barrel 2 at its forward end. The rear portion of the barrel constitutes the cartridge chamber 3. In the end of the barrel just below the chamber 3 is provided a recess 4 communicating therewith. An oblique arcuate member 5 extends from the rear end of the cartridge chamber to the forward end of a rectangular cut 6 in the sidewall of the receiver. A tubular gas cylinder 7, having a snugly-fitting cap 8, is supported at its front end by a bracket 9 carried by the barrel. The cap 8 has at its forward end a reduced cylindrical portion 10, near the end of which is cut the groove 11. The bracket 9 is provided with the bore 12, which at its rear end is of approximately the same diameter as the portion 10, but the upper surface of which is tapered as at 13. In the lower portion of the forward end of the bore is provided a projection 14 adapted to register with the groove 11. To the rear of the bore 12 the bracket is cut

away to form a semicircular recess 15 which is of such a curvature as to snugly receive the cap 8. Extending from the bore of the barrel 2 and arranged obliquely opposite the projection 14 in the bore 12, is the gas port 16, which is adapted to align with the port 17, in the cap 8, obliquely opposite the groove 11 in the portion 10. Extending through the cap and gas cylinder are suitable vents for the escape of the gases after they have accomplished their purpose. At the rear end of the gas cylinder 7, and firmly attached thereto, is a collar 18 grooved on its upper portion to provide a seat 19 for the barrel 2. Integral with the collar and extending rearwardly from the bottom thereof is a rectangular-shaped plate or strip 20, the inner end of which is offset upwardly at 21, there being an upwardly-projecting lug 22 at the rear end of the offset portion 21 which engages, when the gun is assembled, with the socket 23 in the front wall of the receiver 1. The offset portion 21 is also reduced in width to enable it to fit between the arms of the action rod. Reciprocatively mounted in the cylinder 7 is the tubular piston 24, the front end of which is closed, and to the outer or rear end of which is attached the action slide 25, comprising the rectangular hollow head 26 and the solid tail member 27 having a transverse depression 28 in its upper surface, and a longitudinal recess 29 in its under surface, the head and tail being joined by the arms 30. Within the piston 24 is located the action spring 31, the forward end being in contact with the closed forward end of the piston, and the rear end thereof abutting against the head 32 of the guide pin 33, the head 32 being attached to the offset portion 21 by the tongue and groove connection shown to advantage in Fig. 12. In the bottom of the plate 20 there is provided a groove 34 which extends to the collar 18. A slot 35 of narrower width than the groove 34 is cut clear through the plate 20 and extends nearly the length of the groove 34. Slidably mounted in the groove 34 is a charging slide 36 which carries at its forward end the detachable lug 37, the lug extending through the slot 35 and engaging the head 26 of the action slide. The charging slide is provided with a handle 38 at its rear end by means of which it may be reciprocated. In the rear end of the charging slide is a yielding stud 39 which is adapted to engage, as shown in Fig. 8, with the front wall of the receiver to normally maintain the charging slide in its forward position. In the hollow head 26 of the action slide is contained a buffer 40 between which and the rear wall of the head 26 is provided a cushioning means comprising a number of resilient split rings 41 having their adjacent ends offset.

The bottom of the receiver is closed by the bottom plate 42, having the tongues 43 which engage in grooves 44 on the outside of the lower portion of the receiver 1. The bottom of this plate is substantially in alinement with the bottom of the plate 20 and supports the latter by virtue of the engagement of the bottom of the offset portion 21 of the plate 20 with the top of the front end of the bottom plate 42. In the forward portion of the plate 42 is cut an aperture 45, of a sufficient size to allow a cartridge to pass through, there being cut, in the under surface of the plate at the rear end of the aperture, a groove 46. Carried by the bottom plate 42 is a housing 47, cut away at its rear end to form a trigger guard, and in which are located the sear, trigger and firing control, which will be later described. Near the rear end of the plate 42 is an aperture 48, and in alinement with this aperture is an oblique cut 49. In the front end of the receiver are cut the two slots 50 in which fit the arms 30 of the action rod.

The breech mechanism comprises a reciprocating carriage 51, the edges of which enter the longitudinal grooves 52 on the interior of the side walls of the receiver. A projection 53 depending from the bottom of the carriage rests in the depression 28 in the tail of the action slide. Extending upwardly from the carriage is the rib 54, in which is cut the groove 55, the sides thereof being oblique to the surface of the carriage. In the forward portion of the rib 54 is an arcuate depression 56, the rear portion thereof being of greater depth than the forward portion. Slidably mounted on the carriage 51 is the breech bolt 57, the upper part of which is cut away leaving the tail piece 58 and the head 59. Extending longitudinally of the bolt is an aperture 60 of sufficient width to receive the rib 54, the aperture extending somewhat into the head piece, forming the ears 61. Pivotally mounted on the breech bolt in such a way as to close the aperture 60 is the locking lever 62, the upper surface of which is flush with the upper surface of the head 59. The locking lever 62 has at its forward end a shank 63 of sufficiently less width than the body portion of the lever to fit between the ears 61. Carried by the shank is the head 64 of general cylindrical configuration, the diameter thereof slightly exceeding the thickness of the shank 63, the ends of the head being flush with the sides of the body portion. In the ears 61 are recesses 65 having the overhanging shoulders 65^a, said recesses being arranged to receive the head 64, and the distance between the shoulders 65^a being equal to the thickness of the shank 63. The locking lever 62 is provided on its rear bottom surface with a lug 66 shaped to coact with the groove 55 so that a relative reciprocation of the carriage and breech bolt induces an oscilla-

tion of the locking lever. In the rear portion of the locking lever is a roller or ball 62ª adapted to contact with the upper wall of the receiver to minimize the friction between the locking bolt and the top of the receiver. In the upper wall of the receiver 1 is a depression 67, in which the locking lever 62 is adapted to seat when the lever is in locked-up position. The firing pin 68 is reciprocatively mounted in a bore or groove extending through the forward wall of the breech bolt, and along one wall of the aperture 60, and is provided with a head 70 of such configuration that when it rests in the depression 56 it is flush with the top and side of the rib 54. Just below the firing pin aperture is a recess 71 having a depression 72 in its upper rear end and a socket 73 in its rear wall. An extractor 74, having a lug 75 adapted to fit into said depression and a spring 76 carried in a socket 77 adapted to seat in the socket 73, is located in the recess 71. A longitudinal rib 78 extends along one side of the breech bolt 57 and is grooved at 79. In this groove there is mounted, for limited reciprocation, an ejector 80, the front end of which is oblique, and the rear end of which projects beyond the rear of the breech bolt. At its forward end the ejector has a lateral lug 81 which rests in the socket 82 and limits the rearward movement of the ejector. At the rear end of the ejector is another lug 83 which is engaged by the end of the spring 84, located in a depression at the bottom of the groove 79. This spring serves to limit the forward movement of the ejector and also serves to normally hold the ejector in its rear position. The ejector is positively held in the groove by the engagement of the lug 81 in the socket 82, and by the overhanging dog 85 in the tail 58, which may be pressed in against the action of the spring 86 when it is desired to remove the ejector.

Cut from the upper surface of the bottom plate 42 and extending into the housing 47 is a groove 87, the forward end of which is extended downwardly to form a well 88. he upper portion of this groove is of greater width than the lower portion thereof, thus forming the shoulders 89 extending longitudinally of the groove. In the groove 87 is pivotally mounted, by means of the slightly-tapered removable pin 90, the sear 91, having the legs 92 at its forward end adapted to engage the shoulders 89 to limit the downward movement of the forward end of the sear. Reciprocatively mounted on the shoulders 89 in the groove 87, directly below the sear 91, is the trigger 93, having at its forward end the head 94 extending down into the well 88, the upper forward end of the head being reduced sufficiently to extend between the legs 92 of the sear 91, and at its rear end the finger piece 95. Carried by the forward end of the sear is a wire spring 96 which bears against the trigger and serves to normally hold the rear end of the sear elevated as shown in Figs. 7 and 8, the contact of the legs 92 with the shoulders 89 preventing the engagement of the forward ends of the trigger 93 and sear 91. On the under surface of the forward end of the sear is a projection having the face 97 oblique to the surface of the sear, and the face 98 perpendicular thereto. This projection is preferably formed by cutting two transverse notches in the sear. In the head 94 is a recess in which is pivotally mounted a dog 99, an oblique-faced portion 100 of which projects above the surface of the trigger sufficiently to aline with the projection on the sear. This dog is normally held in the position shown in Figs. 7 and 8 by the spring 101, but may be rotated rearwardly so that the dog is wholly within the socket. The trigger is normally held in its forward position by means of the stud 102 seated in aperture 103 at the rear end of the groove 87 and bearing against the spring 104 seated in the socket 105 in the end of the trigger. Extending through the walls of the well 88 is a transverse elliptical cut in which is reciprocatively mounted a slide 106, having in its forward edge a cut 107 of sufficient width to receive the head 94 of the trigger and shoulders 108 and 109 on the sides of the cut. On the rear edge of the slide are cut the notches 110, 111 and 112, the adjacent walls of the notches 110 and 111 being oblique to the edge of the slide 106, while the wall of the notch 111 adjacent to the notch 112 is approximately perpendicular to the edge of the slide, the wall of the notch 112 adjacent the notch 111 also being oblique to the edge of the slide. Reciprocatively mounted in the well 88 below the slide 106 and the head 94 is a semicircular rod 113 which extends out through a bore in the forward wall of the housing 47. The forward end of this rod is provided with a cylindrical head 114 and carries at its rear end a projection 115 adapted to engage in any of the notches 110, 111 and 112. One of the faces of this projection is oblique and the other perpendicular to the edge of the slide 106. The rod 113 is normally held with its projection 115 in contact with the slide 106 by the spring 116.

The head 117 of the stock A is shaped to close the rear end of the receiver 1 and has a tongue 118 extending laterally therefrom except at the bottom. This tongue is adapted to fit into the groove 119 extending around the interior of the rear end of the receiver to constitute therewith a detachable connection. On the bottom of the head 117 is a spring-pressed cam-faced stud or rib 120 which is adapted to enter the

aperture 48 in the bottom plate 42 when the gun is assembled, in order to lock together the stock and bottom plate.

Carried by the receiver 1 is a housing 121 which has an opening therethrough adapted to register with the aperture 6 in the receiver wall. This housing is provided with tongues 122 and 123 which rest in the grooves 124 and 125 on the top and side of the receiver, the housing being slipped onto the receiver from the front end thereof and held in proper position by the screw 126.

The magazine 127 is held in this housing in alinement with the aperture 6 by means of the dog 128. The inward movement of the magazine is limited by the stop 129 in the top of the receiver, so arranged as to position the magazine to present the cartridges in position to be chambered.

On the rear of the receiver is provided a groove 130 in which may be placed a suitable sight. Carried by the member 20 of the action unit is the forearm 131 which may be attached to said member in any suitable manner.

Because of the arrangement and structure of the various elements of the gun, those elements which directly coact with each other may be assembled into self-contained units. Thus the gas cylinder 7, the cap 8, the plate 20, the piston 24, the action slide 25, the action spring 31, the guide pin 33, and the charging slide 36 may be assembled to form the action unit. In assembling this unit the charging slide 36 is first placed in the groove 34 in the plate 20, and the lug 37 attached thereto at the forward end in such a way that it projects through the slot 35. The piston 24 is then inserted in the gas cylinder 7. The action spring 31 is now placed on the guide rod 33 with one end abutting the head 32 of the pin. The other end is then inserted in the piston and compressed until the head 32 can be joined to the offset part 21 of the strip 20 by means of the dove-tail connection previously described. The cap 8 may then be placed over the forward end of the gas cylinder.

The firing control unit which comprises the bottom plate 42, the sear 91, the trigger 93, and the firing control mechanism, may be assembled by first inserting the rod 113 through the front wall of the housing 47 and then inserting the slide 106 through the side wall of the housing, the rod being pushed in against the action of the spring 116 sufficiently to allow clearance between the projection 115 on the rod 113 and the rear edge of the slide 106. The projection 115 is then engaged in one of the notches in the rear edge of the slide, preferably the notch 111. The trigger is then placed in position by placing the stud 102 in the aperture 103 in the rear wall of the groove 87 and compressing the spring controlling the stud until the head 92 at the front end of the trigger clears the front wall of the groove 87. Next the sear 91 is positioned and the tapered pin 90 inserted.

The breech mechanism comprises the carriage 51, the breech bolt 57, the firing pin 68, the locking lever 62, the extractor 74, and the ejector 80. The extractor 74 with the spring 76 in position is placed in the recess 71 and the free end of the spring 76 inserted in the depression 73, and forced in against the action of the spring until the lug 72 engages in the socket 75 in the upper wall of the recess 71. The spring 84 is laid in the recess in the rear end of the groove 79. The ejector 80 is then so placed in the groove 79 that the bottom edge of the lug 83 at its rear end engages the rear end of the spring 84, and the rear end of the ejector engages and depresses the stud 85. The ejector 80 is then pressed forward against the action of the spring 84 until the lug 81 at the forward end thereof can seat in the socket 82 in the forward end of the breech bolt. The rear end of the ejector is then forced downwardly into the groove allowing the stud 85 to project over the top thereof. When the ejector is released the spring 84 will move it into the position shown in Fig. 13. The firing pin 68 is then inserted in the bore 69 with its head 70 projecting into the aperture 60. The carriage 51 is then positioned with the rib 54 in the aperture 60 in the bolt and the head 70 of the firing pin 68 is placed in the recess 56 in the rib 54 in such a way that the straight parts of the head are flush with the surface of the rib. After this the locking lever 62 is added by inserting the head 64 thereof laterally into the socket 65 while the lever is held at right angles to the bolt. It is then dropped down onto the breech bolt 57. The housing 121 is assembled with the receiver 1 by engaging the tongues 122 and 123 in the grooves 124 and 125 respectively, and sliding it into place, after which it is held there by the screw 126.

Having the units assembled, the gun is put together as follows:

The breech mechanism E is placed in the receiver by engaging the edges of the carriage 51 in the grooves 52 in the receiver 1 and sliding it into the extreme forward part of the receiver. The action unit D is next attached by placing the cap 8 in the bracket 9, as shown in Fig. 23, and then pivoting the unit until the arms 30 of the action rod enter the grooves 50 in the front wall of the receiver, and the lug 22 on the offset portion 21 of the strip 20 is in alinement with the socket 23 in the front wall of the receiver. The charging slide is then moved rearwardly sufficiently to allow the depression 28 on the tail 27 of the action rod 25 to receive the lug 53 on the bottom of the carriage 51. As the lug 53 seats in the depression 28, the lug 22

also seats in the socket 23 and the cap 8 fits snugly into the socket 15 with the gas ports 16 and 17 in alinement, this being caused by the engagement of the notch 11 on the portion 10 of the cap 8, with the projection 14 in the bore 12 of the bracket 9. The bottom plate 42 of the firing control unit B is now slid onto the receiver from the rear end thereof, the tongues 43 fitting in the grooves 44, and pushed forward until its front end slips between the offset portion 21 of the plate 20 and its rear end clears the grooves 119 in the rear end of the receiver 1. The tongue 118 of the head 117 of the stock unit A is next engaged in the grooves 119 of the receiver and pushed upwardly until the head closes the rear end of the receiver and the lower end thereof is flush with the bottom of the receiver. The bottom plate 42 is now moved rearwardly, and in so doing the oblique surface 49 engages the cam face of the dog 120 in the head of the stock, causing it to recede. This movement is continued until the stud 120 is released and seats in the aperture 48 in the bottom plate. To assemble these units no tools of any description are necessary. To disassemble the gun, the stud 120 is depressed by means of a suitable tool, such as a cartridge, nail or rod of small diameter, until the bottom plate can be pushed forward. The gun is then taken down in the reverse order of its assembly.

The operation of the gun is as follows: The action rod is moved rearwardly by pulling on the handle 38 of the charging slide 36 until the rear end of the sear 91 engages with the rear end of the groove 29 on the bottom of the tail 27 of the action rod 25, after which the charging slide is returned to its forward position where it is held by the engagement of the stud 39 with the front wall of the receiver 1. The gun is now in its cocked position, such position being clearly shown in Fig. 7. Fig. 9 shows a cartridge in position to be chambered.

With the firing control set for semi-automatic firing, the following cycle of operation takes place. The trigger 93 is pulled rearwardly. The cam face on the projection 100 of the dog 99 in the head of the trigger 94 engages the oblique surface 97 of the projection on the bottom of the sear. The camming action between these two members causes a sufficient rotation of the sear to disengage the rear end thereof from the rear wall of the groove 29 in the action rod. At the instant of disengagement the action rod, carrying with it the carriage 51 and breech bolt 57, starts forward under the influence of the action spring 31. The further rearward movement of the trigger disengages the contacting cam faces and allows the sear to return to its normal position under the influence of the spring 96. A release of the trigger allows it to move forward under the influence of the spring 104. As it moves forward, the dog 100 yields sufficiently to allow the trigger to resume its forward position without moving the sear. As the breech bolt moves forward, the forward end of the projection 78 engages the rear end of a cartridge presented in proper position by the magazine and pushes it into the chamber 3, the cartridge being directed therein by means of the member 5. When the bolt reaches its forward position, it engages with the rear end of the barrel, the extractor 74 extends into the socket 4 under the head of the cartridge and engages in the groove at the rear end thereof.

After the bolt has ceased to move forward the carriage is carried still further forward, this being possible because of the fact that the breech bolt 57 is slidably mounted on the carriage. As the carriage moves forward the rear wall of the groove 55 in the rib 54 exerts a camming action on the rear face of the lug 66 of the locking lever 62 and forces it up into the socket 67 in the top wall of the receiver 1, thus locking the breech bolt in position. At the instant that the locking lever 66 is fully seated in the socket 67, the firing pin is projected through the aperture in the front wall of the bolt. The engagement of the firing pin with the primer of the cartridge explodes the latter. The gas formed by the explosion of the cartridge passes through the gas port 16 into the cylinder 7, and with a blow-like effect forces the piston rearwardly against the action of the spring 31. The piston forces back the action rod which in turn moves the carriage rearwardly. The initial movement of the carriage draws back the firing pin and disengages the locking lever from the socket by virtue of the engagement of the front wall of the groove 55 with the front face of the lug 66. Further rearward movement of the carriage causes the bolt to move rearwardly. When the bolt has nearly reached its rearward limit of travel, the rear end of the ejector 80 strikes the head 117 of the stock. A further movement of the bolt causes the front end of the ejector to project from the forward end of the bolt. In so doing it engages with the rear end of the shell and disengages it from the extractor, throwing the cartridge downwardly through the slot 45 in the bottom plate 42. The action rod and carriage move rearwardly with decreasing speed because of the compression of the spring 31, until the buffer 40 engages the front wall of the receiver and compresses the cushioning means 41. The elements then move forward slightly until the rear end of the sear 91 again engages the rear wall of the groove 29.

The firing control allows the gun to be locked in a safety position, to be set for

single shots or for continuous firing. When the slide 106 is so positioned that the shoulder 108 engages the front wall of the head 94 of the trigger, the latter cannot be moved and the gun is safe. If the slide 106 be placed with the cut 107 in alinement with the head 94, then the gun is set for single shots or semi-automatic firing. The trigger now can be moved all the way back. By reason of the arrangement of notches and cam faces on the sear 91 and dog 99 previously described, the sear will be tripped and then allowed to return to normal position. When the slide is placed with the shoulder 109 in position to be engaged by the head 94, the rearward movement of the trigger is limited. With such arrangement the trigger can be moved only enough to trip the sear but not enough to allow the sear to return to normal position. By merely holding the trigger back with such arrangement of the parts, the gun will fire automatically.

The connection between the barrel and the gas cylinder is such that the gas ports 16 and 17 will always be in alinement. For this reason it is possible to bore these parts the exact size desired. In the past it has been the custom to make one of these ports, generally the one in the gas cylinder, over size in order to permit expansion of the barrel without restricting the effective size of the gas port. In this gun, the gas port 17 is in the cap 8, and as the barrel expands longitudinally, the cap slides on the cylinder 7, thus keeping the ports 16 and 17 always in alinement.

It will be clearly understood that while the invention has been illustrated as embodied in a shoulder or light gas-operated gun, yet the invention is not at all limited to such type of gun, since many of the features of the invention are equally as well applicable to the heavy or tripod type of gun, of either the gas or recoil-operated types.

What I claim is:

1. In a take-down automatic firearm, a receiver, a barrel carried thereby, a stock, a bottom plate for said receiver, and a self-contained action unit composed of a plurality of coacting elements, said bottom plate being effective to maintain said other members in assembled relation.

2. In a take-down automatic firearm, a receiver, a barrel carried thereby, a self-contained action unit composed of a plurality of coacting elements, and means for detachably connecting said unit to said barrel and receiver.

3. In a take-down automatic firearm, a receiver, a barrel carried thereby, a self-contained action unit composed of a plurality of coacting elements, and a bottom plate for said receiver, said bottom plate being effective to attach said action unit to said receiver.

4. In a take-down automatic firearm a receiver a barrel carried thereby a self-contained action unit composed of a plurality of coacting elements a stock and a bottom plate for said receiver, said bottom plate being effective to maintain said action unit, receiver, and stock in their assembled relation.

5. In a take-down automatic firearm, a receiver, a barrel carried thereby, a self-contained action unit composed of a plurality of coacting elements and a bottom plate slidably carried by said receiver, said plate being effective to maintain said action unit and said receiver in their assembled relation.

6. In a take down automatic firearm, a receiver, a barrel carried thereby, a self-contained action unit composed of a plurality of coacting elements, a bottom plate slidably carried by said receiver and a stock, said plate being effective to maintain said action unit, stock and receiver in their assembled relation and to release said stock from said relation by movement of said plate relative to said receiver.

7. In a take down automatic firearm, a receiver, a stock, and a bottom plate carried by said receiver, said bottom plate being effective to maintain said stock and receiver in their assembled relation.

8. In a gun, a receiver open at the bottom and rear, a barrel carried by said receiver, an action unit, means to attach the forward end of said action unit to the barrel, interengaging means on the rear end of the action unit and the front wall of the receiver, a stock, means to engage the stock with the rear end of the receiver, and a closure-plate for the bottom of the receiver, said plate holding in place the said interengaging means and also the stock.

9. In a gun, a receiver open at the bottom and rear, a barrel carried by said receiver, an action unit including a movable member extending into the receiver, means to attach the action unit to the barrel and receiver, a breech mechanism in the receiver engaging the movable member of the action unit, a firing-control unit including a plate forming the bottom of the receiver and overlapping the inner end of the action unit, means for attaching the plate to the receiver, a stock, means to attach the stock to the receiver, and means to lock together the stock and plate.

10. In a firearm, a receiver open at the bottom and rear, a barrel extending from the front wall of the receiver, an action unit including a movable member extending into the receiver, means for supporting said action unit, a breech unit slidably mounted in the receiver, means to connect said breech unit with the movable member of the action

unit, a firing-control unit including a plate mounted on the bottom of the receiver and engaging the rear end of the action unit, a stock mounted in the rear end of the receiver and means to lock together the stock and the plate.

11. In a firearm, a receiver open at the bottom and rear, a barrel extending from the front wall of the receiver, an action unit including a movable member extending into the receiver, means on the barrel for supporting one end of the action unit, interengaging means on the rear end of the action unit and the front wall of the receiver, a breech unit slidably mounted in the receiver, means to connect said breech unit to said movable member, a firing-control unit including a plate mounted on the bottom of the receiver and supporting the rear end of the receiver and means to lock together the stock and the plate.

12. In a firearm, a receiver open at the bottom and rear and having longitudinal grooves on the outer surfaces of its walls, a barrel extending from the front wall of the receiver, an action unit including a movable member extending into said receiver, means for supporting said action unit, a breech unit slidably mounted in the receiver, means to connect the breech unit with the movable member of the action unit, a firing-control unit including a plate having tongues to engage with the longitudinal grooves of the receiver supporting the rear end of the action unit, a stock mounted in the rear end of the receiver, and means to lock together the stock and the plate.

13. In a firearm, a receiver open at the bottom and rear and having a transverse groove on the inner surface of the rear end thereof, a barrel extending from the front wall of the receiver, an action unit including a movable member extending into said receiver, one end thereof being detachably supported by the forward end of the barrel and the other end detachably engaged with the front wall of the receiver, a breech unit slidably mounted in the receiver, means to connect the breech unit with the movable member of the action unit, a firing-control unit including a plate mounted on the bottom of the receiver and engaging the rear end of the action unit, a stock having a rib engaging said groove in the rear end of the receiver and means to lock together the stock and the plate.

14. In a firearm, a receiver open at the bottom and rear, a transverse groove on the rear end of the inner surface thereof, longitudinal grooves on the outer surfaces of the walls, a barrel extending from the front wall of the receiver, an action unit supported at its front end by the barrel and having its rear end engaged with the front of the receiver, said action unit including a movable member extending into the receiver, a breech unit slidably mounted in the receiver and engaged by the movable member of the action unit, a firing-control unit including a plate having tongues to engage said longitudinal grooves, said plate supporting the rear end of the action unit, a stock having a head with a rib to engage said transverse groove, and means to lock together the stock and the plate.

15. In a firearm, a receiver open at the bottom and rear, a transverse groove on the rear end of the inner surface thereof, longitudinal grooves on the outer surfaces of the walls, a barrel extending from the front wall of the receiver, an action unit supported at its front end by the barrel and having its rear end engaged with the front wall of the receiver, said action unit including a movable member, a breech unit slidably mounted in the receiver and engaged by the movable member of the action unit, a firing-control unit including a plate having tongues to engage said longitudinal grooves, an aperture in the rear end of said plate, said plate supporting the rear end of the action unit, and a stock having a head with a rib to engage said transverse groove and a pin to seat in said aperture.

16. In a firearm, a receiver open at the bottom and rear, a barrel extending from the front wall of the receiver, an action unit, one end thereof being detachably supported by the forward end of the barrel and the other end detachably engaged with the front wall of the receiver, a breech unit slidably mounted in the receiver and detachably engaged with a member of the action unit, a firing-control unit including a plate detachably mounted on the bottom of the receiver and engaging the rear end of the action unit, and a stock detachably mounted in the rear end of the receiver and provided with means to lock together the stock and the plate.

17. In a firearm, a receiver open at the bottom and rear, a barrel extending from the front wall of the receiver, an action unit, including a movable member, having its front end supported by the barrel and its rear end engaged with the front wall of the receiver, a breech unit slidably mounted in the receiver and engaged with the movable member of the action unit, a firing-control unit including a plate detachably mounted on the bottom of the receiver and engaging the rear end of the action unit, and a stock detachably mounted in the rear end of the receiver and provided with means to lock together the stock and the plate.

18. In a firearm, a receiver open at the bottom and rear, a barrel extending from the front wall of the receiver, an action unit, including a movable member, having its front end supported by the barrel and its rear end engaged with the front wall

of the receiver, a breech unit slidably mounted in the receiver and engaged with the movable member of the action unit, a firing-control unit including a plate slidably mounted on the bottom of the receiver and detachably mounted on the bottom of the receiver and engaging the rear end of the action unit, and a stock detachably mounted in the rear end of the receiver and provided with means to lock together the stock and the plate.

19. In a firearm, a receiver open at the bottom and rear and having a transverse groove on the inner surface of the rear end thereof, a barrel extending from the front wall of the receiver, an action unit, one end thereof being detachably supported by the forward end of the barrel and the other end detachably engaged with the front wall of the receiver, a breech unit slidably mounted in the receiver and detachably engaged with a member of the action unit, a firing-control unit including a plate detachably mounted on the bottom of the receiver and engaging the rear end of the action unit, and a stock having a rib engaging said groove in the rear end of the receiver and provided with means to lock together the stock and the plate.

20. In a firearm, a receiver open at the bottom and rear, a transverse groove on the rear end of the inner surface thereof, longitudinal grooves on the outer surfaces of the walls, a barrel extending from the front wall of the receiver, an action unit supported at its front end by the barrel and having its rear end engaged with the front of the receiver, said action unit including a movable member, a breech unit slidably mounted in the receiver and engaged by the movable member of the action unit, a firing-control unit including a plate having tracks to engage said longitudinal grooves, said plate supporting the rear end of the action unit, and a stock having a head with a rib to engage said transverse groove, and means to lock together the stock and the plate.

21. In a firearm, a receiver open at the bottom and rear, a transverse groove on the rear end of the inner surface thereof, longitudinal grooves on the outer surfaces of the walls, a barrel extending from the front wall of the receiver, an action unit supported at its front end by the barrel and having its rear end engaged with the front of the receiver, said action unit including a movable member, a breech unit slidably mounted in the receiver and engaged by the movable member of the action unit, a firing-control unit including a plate having tracks to engage said longitudinal grooves, a socket in its rear end, said plate supporting the rear end of the action unit, and stock having a head with a rib to engage said transverse groove and a pin to seat in said socket.

22. In a gun, a receiver open at the bottom and rear, a barrel carried by said receiver, an action unit including a movable member extending into the receiver, means to attach the action unit to the barrel and receiver, a breech mechanism in the receiver engaging the movable member of the action unit, a firing-control unit including a plate forming the bottom of the receiver and overlapping the inner end of the action unit, means for attaching the plate to the receiver, a stock, means to attach the stock to the receiver, and means to lock together the stock and plate.

23. In a gun, a receiver open at the bottom and rear, a barrel carried by said receiver, an action unit, means to attach the forward end of said action unit to the barrel, interengaging means on the rear end of the action unit and the front wall of the receiver, a stock, means to engage the stock with the rear end of the receiver, and a closure-plate for the bottom of the receiver, said plate holding in place the said interengaging means and also the stock.

24. In an automatic gun, a receiver open at the bottom and rear and having longitudinal grooves on the exterior thereof, a transverse groove on the interior thereof, and a depression in its front wall, a barrel mounted in the front wall of the receiver, a gas cylinder detachably engaged with the front end of the barrel, a port extending from the barrel to the gas cylinder, an action rod having a tubular forward portion extending into said cylinder and a divided rear portion extending into said receiver, a member rigidly attached at its forward end to said gas cylinder and a lug on its rear end seated in said depression in the front wall of the receiver, a head detachably mounted on the rear end of the member, a guide-pin carried by said head, a spring surrounding said guide-pin and extending into said tubular portion of the action rod, a carriage slidably mounted in the receiver and engaged by the rear end of the action rod, a breech bolt slidably mounted on said carriage, an extractor and ejector carried by said breech bolt, locking means carried by said breech bolt, interengaging means on said locking means and carriage, a firing pin carried by said carriage, a bottom plate having tongues engaging the longitudinal grooves in the receiver, said bottom plate having mounted thereon a pivoted sear, sliding trigger and controlling means therefor, the forward end of the said bottom plate engaging the rear end of said member, a stock having a tongue engaging said transverse groove, and inter-

engaging means on said stock and bottom plate to hold the same in assembled relation.

25. In a gun, a receiver open at the bottom and at the rear end, longitudinal grooves on the bottom portion of the receiver and extending the full length thereof, and a bottom-plate having tongues to engage said longitudinal grooves.

26. In a gun, a receiver open at the bottom and at the rear end, longitudinal grooves on the outside of the bottom portion of the receiver, a transverse groove on the inside of the rear end of the receiver, a bottom plate having tongues to engage said longitudinal grooves, and a stock having a tongue to engage said transverse groove.

27. In a gun, a receiver open at the bottom and at the rear end, longitudinal grooves on the outside of the bottom portion of the receiver, a transverse groove on the inside of the rear end of the receiver, a bottom plate having tongues to engage said longitudinal grooves, a stock having a tongue to engage said transverse groove, and means to lock said plate and stock to each other.

28. In a gun, a receiver open at the bottom and at the rear end, longitudinal grooves on the bottom portion of the receiver and extending the full length thereof, a bottom plate having tongues to engage said longitudinal grooves, a transverse groove on the rear end of the receiver, and a stock having a tongue to engage said transverse groove.

29. In a firearm, a receiver open at the bottom and rear end, longitudinal grooves on the bottom portion and extending the full length thereof, a bottom plate having tongues to engage said longitudinal grooves, a transverse groove on the inside of the rear end of the receiver, a stock having a tongue to engage said transverse groove, and a socket in the inner top of said receiver to receive the locking member of a breech mechanism.

30. In a firearm, a receiver, a barrel in the front wall thereof, a slot in the side thereof, a housing mounted on the receiver in alinement with said slot, and guide means on said barrel extending to one end of the slot.

31. In a firearm, a receiver, a barrel in the front wall thereof, a slot in the side thereof, a housing mounted on the receiver in alinement with said slot, means on said housing to attach a magazine thereto, and guide means on said barrel extending to one end of said slot.

32. In a firearm, a receiver, a barrel mounted in the front wall, a slot in the side wall thereof, grooves on the exterior of said receiver, a housing mounted on the receiver in alinement with said slot, means on said housing to attach a magazine thereto and tongues on said housing engaging said grooves.

33. In a gun, a stock having a head provided with a laterally-projecting tongue extending around the sides and top of the head, and a spring-pressed pin on the bottom portion.

34. In a gun, a stock having a head provided with transverse projections, one of said projections being yieldable.

35. In a firearm, an action slide having a socket, a carriage, a lug on said carriage arranged in said socket, a breech bolt movably mounted on said carriage, a firing pin, and locking means carried by said breech bolt, said locking means and said firing pin being operable upon relative movement of the carriage and breech bolt.

36. In a firearm, an action slide having a socket, a carriage, a lug on said carriage arranged in said socket, a recessed breech bolt movably mounted on said carriage, a rib on said carriage extending into said recess, a firing pin, and locking means carried by said breech bolt, said locking means and said firing pin being operable upon relative movement of the carriage and breech bolt.

37. In a gun, an action slide a breech mechanism comprising a carriage supported independently of the action slide but operatively connected thereto, a hollow breech-bolt movably mounted on said carriage, locking means associated with said bolt, and means located within the aperture in the breech bolt for operating the locking means upon relative movement of the carriage and bolt.

38. In a gun, an action slide a breech mechanism comprising a carriage supported independently of the action slide but operatively connected thereto, a recessed bolt movably mounted on said carriage, a firing-pin on the carriage and located in the recess of the bolt, locking means carried by the bolt, means for operating the locking means upon relative movement of the carriage and bolt, and an extractor and ejector carried by the bolt.

39. In a firearm, an action slide a breech mechanism comprising a carriage supported independently of the action slide but operatively connected thereto, a breech bolt movably mounted thereon, a firing pin reciprocatively mounted in the bolt, a locking lever pivotally mounted on the breech bolt and connections between said carriage and said firing pin and locking lever whereby a relative movement of the carriage and bolt operates the firing pin and locking lever.

40. In a firearm, an action slide a breech mechanism comprising a carriage supported independently of the action slide but operatively connected thereto, a recessed breech bolt movably mounted on said carriage, a rib extending from the carriage into the recess, an aperture in the front wall of the breech bolt, a firing pin located in said aperture, a locking lever pivotally mounted on

the bolt, and connections between the rib and said locking lever and firing pin whereby relative movement of the carriage and bolt cause an oscillation of the locking lever and a reciprocation of the firing pin.

41. In a firearm, a carriage, a recessed breech bolt movably mounted thereon, a rib on said carriage extending into the recess, an aperture in the front wall of the bolt, a firing pin located therein, a socket in said rib and a head on said firing pin seated in said socket.

42. In a firearm, an action slide a carriage supported independently of the action slide but operatively connected thereto, a recessed breech bolt movably mounted thereon, a rib on said carriage extending into the recess, a pivotally-mounted locking lever closing the upper part of the recess, a transverse groove in said rib having oblique faces and a lug on said locking lever having oblique faces coacting with said oblique faces on the rib.

43. In a firearm, a breech bolt, a locking lever carried thereby, said locking lever having a generally cylindrical head of greater width than that portion of the lever directly adjacent thereto, lugs on said bolt, a transverse groove extending through said lugs having a body portion of proper dimensions to receive said cylindrical head and a constricted neck portion.

44. In a firearm, a breech bolt, an aperture therein, ears extending from the forward portions of the side walls of said aperture, a locking lever normally closing the upper portion of said aperture, said locking lever having a generally cylindrical head of greater width than that portion of the lever directly adjacent thereto, a transverse groove extending through said ears of proper form to receive said head laterally when the locking lever is arranged approximately perpendicular to the bolt.

45. In a firearm, a breech bolt, an aperture therein, ears extending from the forward portions of the side walls of said aperture, a locking lever normally closing the upper portion of said aperture, said locking lever having a generally cylindrical head of greater width than that portion of the lever directly adjacent thereto, a transverse groove extending through said ears having a body portion of proper dimensions to receive said cylindrical head and a constricted neck portion.

46. In a gun, a breech mechanism comprising a carriage, a breech bolt movably mounted on said carriage, locking means associated with said bolt, and means for operating the locking means upon relative movement of the carriage and bolt.

47. In an automatic gun, a gas cylinder, a member rigidly attached thereto, a piston having a tubular portion reciprocatively mounted in said cylinder, an action slide carried by one end of said piston, a head carried by the free end of the member, and an action-spring interposed between the head and the piston.

48. In an automatic gun, a gas cylinder, a member rigidly attached thereto, a piston having a tubular portion reciprocatively mounted in said cylinder, an action slide carried by one end of said piston, an action-spring extending into said piston, and means carried by the member to act as an abutment for one end of the spring.

49. In an automatic gun, a gas cylinder, a member attached thereto, a piston having a tubular portion reciprocatively mounted in said cylinder, an action-slide carried by one end of said piston, a head carried by the member, and a spring interposed between the said head and the said piston.

50. In an automatic gun, a gas cylinder, a member attached thereto, a piston having a tubular portion reciprocatively mounted in said cylinder, an action slide carried by one end of said piston, a head dovetailed to the member, and a spring interposed between the said head and the said piston.

51. In an automatic gun, a gas cylinder, a member attached thereto, a piston having a tubular portion reciprocatively mounted in said cylinder, an action slide carried by one end of said piston, a head carried by the member, a guide member on said head, and a spring associated with said guide member and interposed between said head and said action rod.

52. In an automatic gun, a gas cylinder, a member attached thereto, an action-rod including a tubular portion extending into the gas cylinder, a head carried by the member, and an action-spring, one end extending into the tubular portion of the action-rod and the other bearing against the head.

53. In an automatic gun, a gas cylinder, a member attached thereto, an action-rod including a tubular portion extending into the gas cylinder, and a divided portion projecting rearwardly from said tubular portion, a head carried by the member and extending into the divided portion of the action-rod, and an action-spring, one end extending into the tubular portion of the action-rod and the other end bearing against the head.

54. In an automatic gun, a gas cylinder, a member attached thereto, an action-rod including a tubular portion extending into the gas cylinder, and a divided portion projecting rearwardly from said tubular portion, a head carried by the member and extending into the divided portion of the action-rod, a guide rod on said head, and an action-spring surrounding said guide rod, having one end extending into the tubular portion of the action-rod and the other end bearing against the head.

55. In an automatic gun, a gas cylinder, a member attached thereto, an action-rod associated with said cylinder and member, an action spring mounted on said member, a charging-slide mounted on said member, and means on said slide to engage the action-rod.

56. In an automatic gun, a gas cylinder, a member attached thereto, an action-rod associated with said cylinder and member, an action spring mounted on said member, a charging-slide mounted on said member, means on said slide to engage the action-rod, and means to operate said slide.

57. In an automatic gun, a gas cylinder, a member attached thereto, an action-rod associated with said cylinder and member, an action spring mounted on said member, a charging-slide mounted on said member, and a detachable lug on said slide to engage the action-rod.

58. In an automatic gun, a gas cylinder, a member attached thereto, an action-rod associated with said cylinder and member, an action spring mounted on said member, a slot in said member, and means operatively mounted in said slot to engage said action-rod.

59. In an automatic gun, a gas cylinder, a member attached thereto, an action-rod associated with said cylinder and member, a slot in said member, means operatively mounted in said slot to engage said action-rod, and means to normally maintain said means in one position.

60. In an automatic gun, a gas cylinder, a member rigidly attached thereto, a piston reciprocatively mounted in said cylinder, an action rod carried by one end of said piston, a head carried by the free end of the member, and an action spring interposed between the head and the piston.

61. In an automatic gun, a gas cylinder, a member rigidly attached thereto, a piston reciprocatively mounted in said cylinder, an action rod carried by one end of said piston, an action spring for said action rod, and means carried by the member to act as an abutment for one end of the spring.

62. In an automatic gun, an action unit comprising a gas cylinder, a member attached thereto, a piston reciprocatively mounted in said cylinder, an action rod carried by one end of said piston, a head carried by the member, and a spring interposed between the said head and the said piston.

63. In an automatic gun, a gas cylinder, a member attached thereto, a piston reciprocatively mounted in said cylinder, an action rod carried by one end of said piston, a head dovetailed to the member, and a spring interposed between the said head and the said piston.

64. In an automatic gun, a gas cylinder, a member attached thereto, a piston reciprocatively mounted in said cylinder, an action rod carried by one end of said piston, a head carried by the member, a guide member on said head, and a spring associated with said guide member and interposed between said head and said piston.

65. In an automatic gun, a gas cylinder, an action-rod having a tubular portion extending into the gas cylinder, a buffer slidably mounted in the exposed end of the tubular portion, and a resilient member engaging said buffer.

66. In an automatic gun, a gas cylinder, a tubular piston, extending into said cylinder, a head carried by the exposed end of the piston, a buffer slidably mounted in the head, and a resilient member interposed between the buffer and the end of the piston.

67. In an automatic gun, an action-rod having a recessed head, a buffer mounted in said head, and a resilient member between the buffer and the end of the recess.

68. In an automatic gun, an action-rod having a head, a socket in said head, a buffer mounted in said head, and a series of resilient split rings interposed between said buffer and the rear wall of said socket.

69. In an automatic gun, a barrel, a bracket carried by said barrel, said bracket having a bore therein, a portion of the surface of which is tapered, a projection opposite said tapered surface, a semicircular recess adjacent said bore, a gas cylinder having a reduced portion adapted to fit into said bore, said reduced portion having a recess adapted to fit over said projection and a main portion adapted to fit in said semicircular recess, and alined gas ports in said barrel and bracket and said cylinder.

70. In an automatic gun, a barrel, a bracket carried by said barrel. said bracket having a bore therein, a portion of the surface of which is tapered, a projection opposite said tapered surface, a semicircular recess adjacent said bore, a gas cylinder having a cap with a reduced portion adapted to fit into said bore, said reduced portion having a recess adapted to fit over said projection and a main portion adapted to fit in said semicircular recess and alined gas ports in said barrel and bracket and said cylinder.

71. In an automatic gun, a barrel, a bracket carried by said barrel, a bore in said bracket having its upper surface tapered, a projection opposite said tapered surface a semicircular recess adjacent said bore, a gas cylinder having a reduced portion adapted to fit into said bore over said projection and a main portion adapted to fit in said semicircular recess, and aligning gas ports in said barrel and bracket and said cylinder.

72. In an automatic gun, a barrel, a

bracket carried by said barrel, a bore in said bracket having its upper surface tapered, a projection opposite said tapered surface a semicircular recess adjacent said bore, a gas cylinder having a cap with a reduced portion adapted to fit into said bore over said projection and a main portion adapted to fit in said semicircular recess, aligning gas ports in said barrel and bracket and said cylinder.

73. In an automatic gas-operated gun, a barrel, a gas cylinder, a cap on said cylinder, gas ports in said cap and barrel, and means carried by the barrel for connecting said barrel and cap whereby said gas ports are constantly maintained in alinement.

74. In a repeating firearm, a receiver, a breech bolt reciprocatively mounted therein, a locking member carried by said breech bolt, means tending to force said locking member into contact with a wall of said receiver during a part, at least, of the reciprocation of said breech bolt, and antifriction means interposed between said locking means and said wall of the receiver.

75. In a repeating firearm, a receiver, a breech bolt reciprocatively mounted therein, a locking member carried by said breech bolt, means tending to force said locking member into contact with a wall of said receiver during a part, at least, of the reciprocation of said breech bolt, and antifriction means carried by said locking member adapted to contact with said wall of the receiver.

76. In a take down automatic firearm, a receiver having grooves in its side walls, a stock having tongues to engage in said grooves, and a bottom plate carried by said receiver, said bottom plate serving to close the ends of said grooves and maintain said stock and receiver in their assembled relation.

77. In a take down automatic firearm, a receiver, a stock attachable thereto by the transverse movement of the stock relative to the receiver, and a bottom plate carried by said receiver, said plate being adapted to overlap a portion of the stock to prevent movement thereof relative to the receiver.

78. In a take down automatic firearm, a receiver, a stock attachable thereto by the transverse movement of the stock relative to the receiver, a bottom plate slidably carried by said receiver, said plate being adapted to overlap a portion of the stock to prevent movement thereof relative to the receiver, and means on said plate and stock to prevent movement of said plate relative to said stock.

79. In a take down automatic firearm, a receiver, a stock attachable thereto by the transverse movement of the stock relative to the receiver, a bottom plate having an aperture therethrough, said plate being slidably carried by said receiver, said plate being adapted to overlap a portion of the stock to prevent movement thereof relative to the receiver, and a spring pressed stud on said stock to enter said aperture and prevent relative movement of said plate and stock.

80. In an automatic gun, a gas cylinder, a piston, an action slide and an action spring, said elements being provided with means to maintain them in their operative relation to form a self-contained unit removable from the gun.

81. In an automatic gun, a barrel, a bracket carried by said barrel, said bracket having a tapered bore, a gas cylinder having a portion adapted to be received in said bore, ports in said barrel and cylinder, and means on said cylinder and bracket for guiding said ports into alinement.

82. A breech mechanism for firearms comprising a carriage, means to connect said carriage to an action slide, a breech bolt movably mounted on said carriage, a locking member pivotally attached to said bolt and means whereby relative movement of said carriage and breech bolt is effective to operate said locking member.

83. A breech mechanism for firearms comprising a carriage, means to detachably connect said carriage to an action slide, a recessed breech bolt slidably mounted on said carriage, a firing pin movable relative to said breech bolt and extending into the recess in the bolt, and means on said carriage to operate said firing pin upon movement of said breech bolt relative to said carriage.

84. A breech mechanism for firearms comprising a carriage, a breech bolt slidably mounted thereon, a firing pin reciprocable relative to said bolt, and a detachable connection between said firing pin and said carriage.

85. A breech mechanism for firearms comprising a carriage, means for attaching said carriage to an action slide, a breech bolt movably mounted on said carriage, a locking member carried by said breech bolt, a firing pin movable relative to said breech bolt, and means whereby relative movement of said breech bolt and carriage is effective to operate said firing pin and locking member.

86. A breech mechanism for firearms comprising a carriage, a recessed breech bolt slidably mounted on said carriage, a firing pin reciprocatively mounted in said breech bolt and extending into the recess in said breech bolt, and a rib on said carriage projecting into said recess, said rib and said firing pin being connected.

87. A breech mechanism for firearms comprising a carriage having means to op-

eratively connect it with an action slide, a breech bolt movably mounted on said carriage, a locking member carried by said breech bolt, and means whereby relative movement of said carriage and breech bolt is effective to operate said locking member.

88. A breech mechanism for firearms comprising a carriage, means thereon to connect said carriage with an action slide, a breech bolt movably mounted on said carriage, a locking member carried by said breech bolt, means whereby relative movement of said carriage and breech bolt is effective to operate said locking member, an extractor carried by said bolt, and an ejector slidably mounted on said bolt.

CARL GUSTAF SWEBILIUS.