O. V. PAYNE.

FIREARM.

APPLICATION FILED MAY 15, 1919.

1,357,208.

Patented Oct. 26, 1920.

5 SHEETS—SHEET 1.

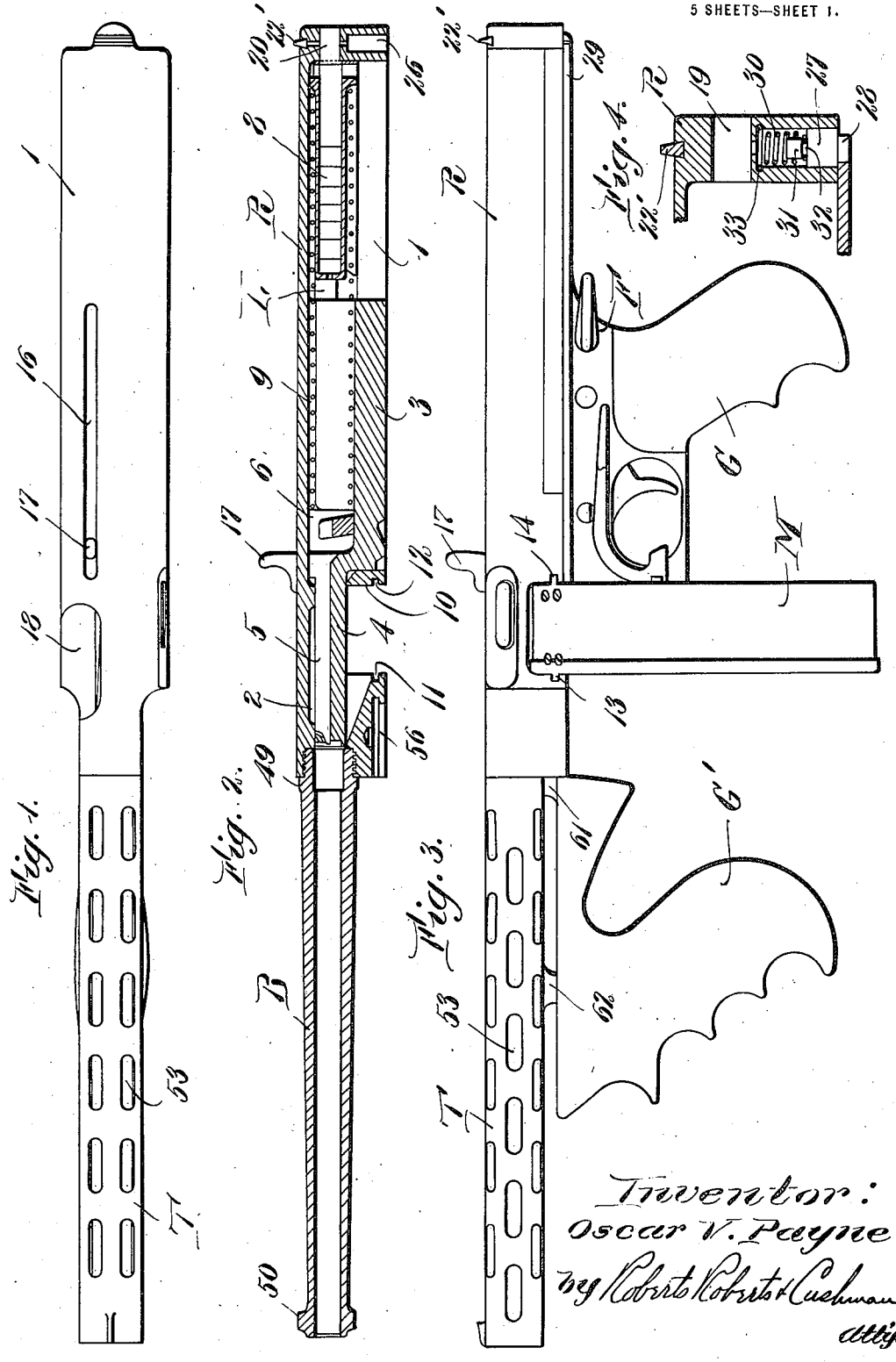

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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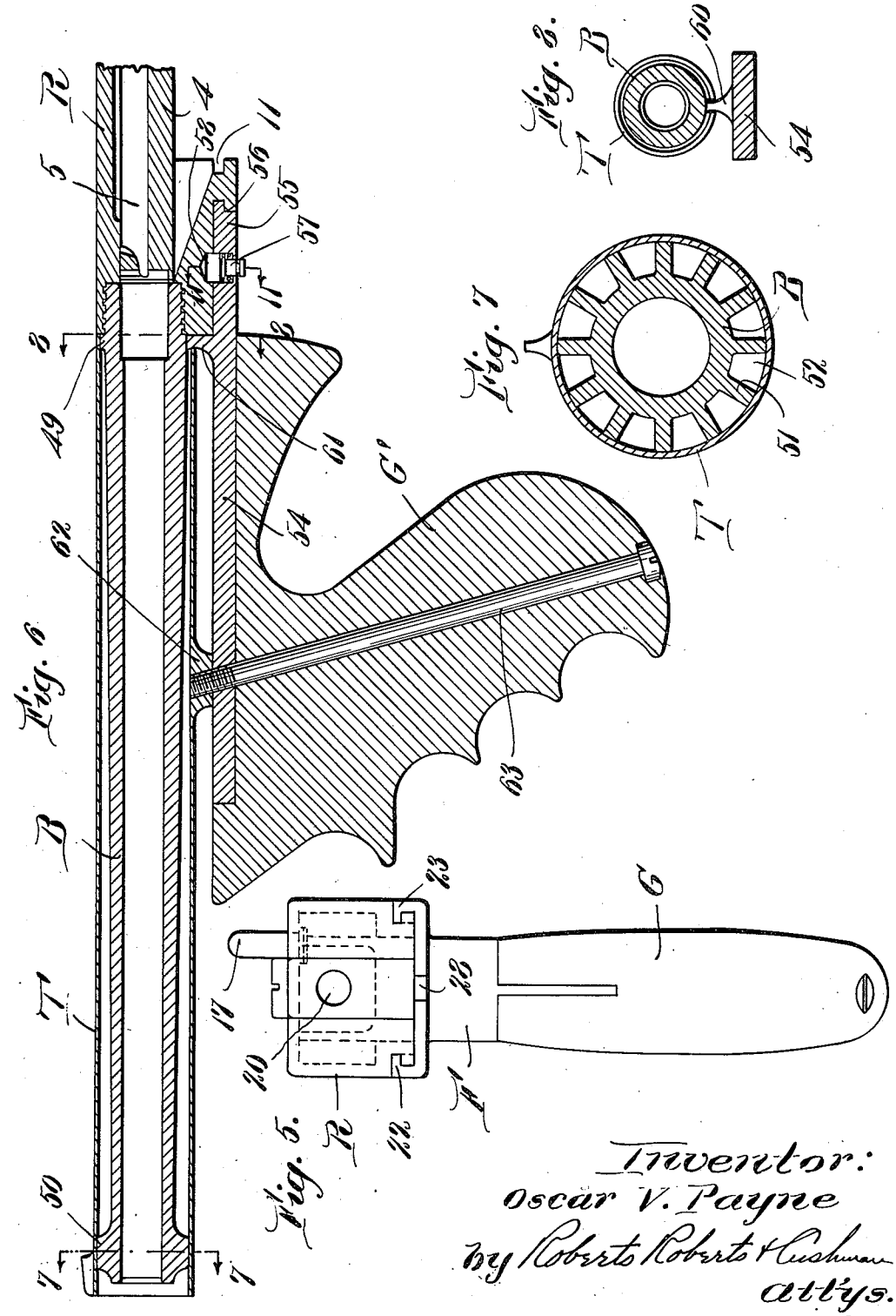

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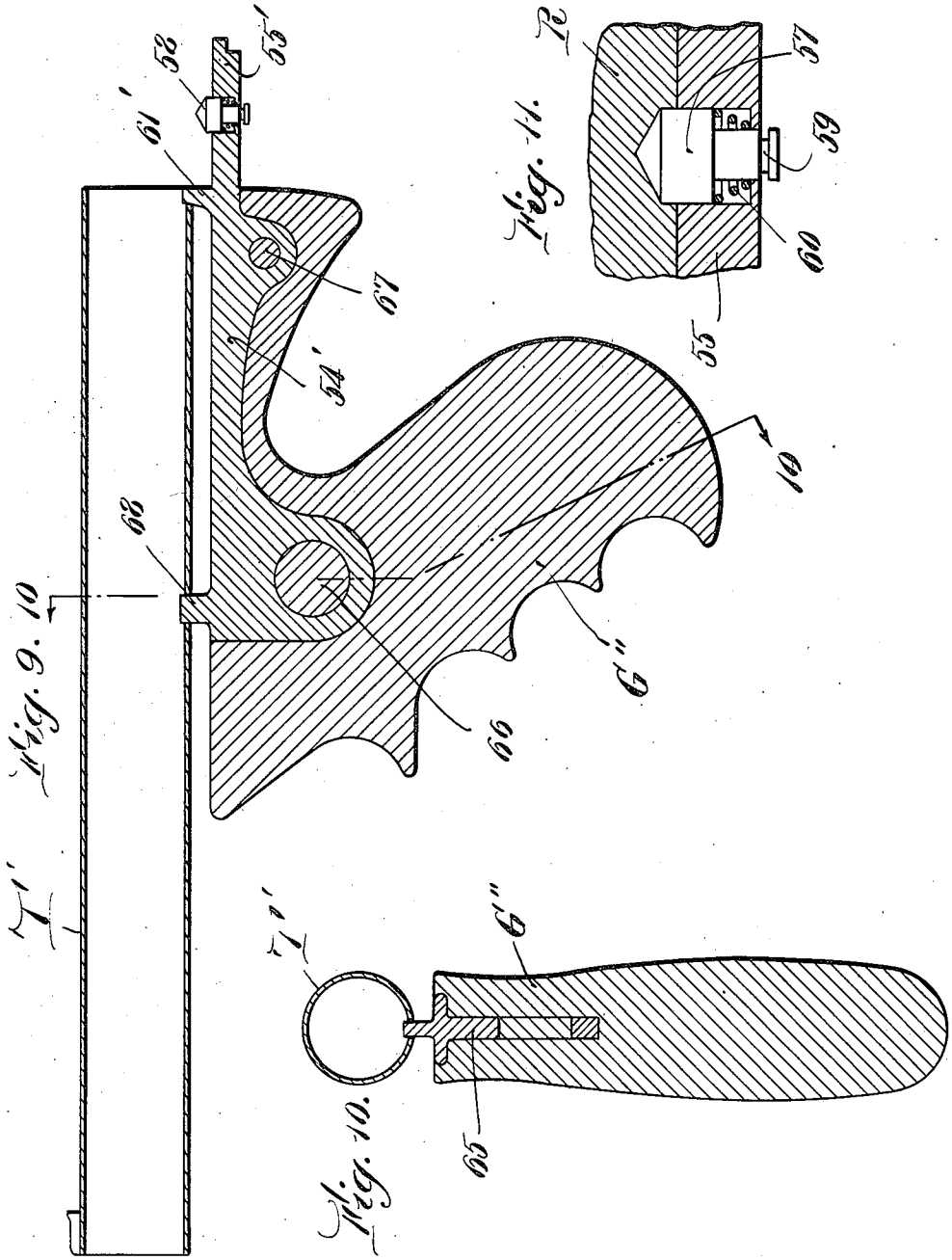

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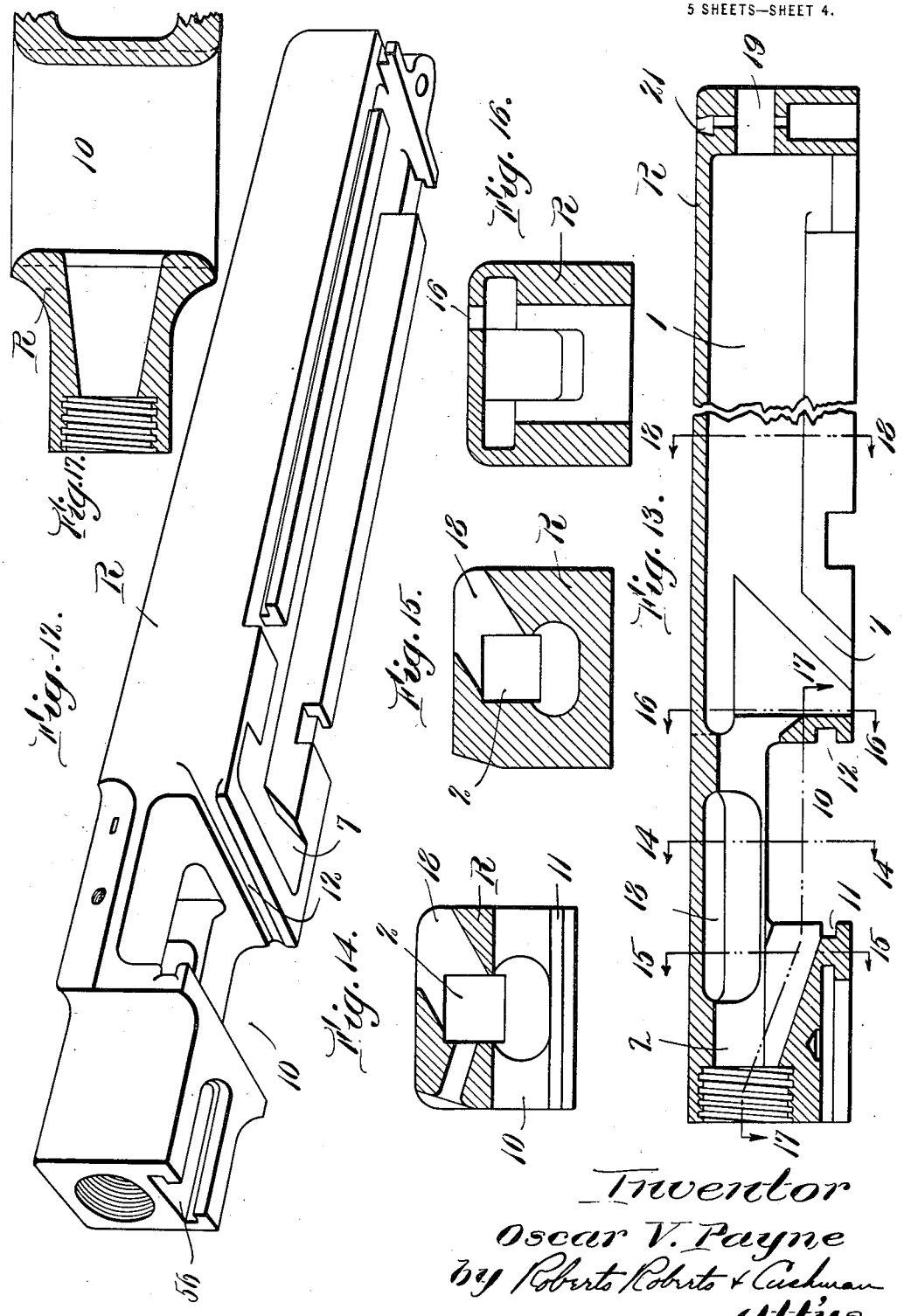

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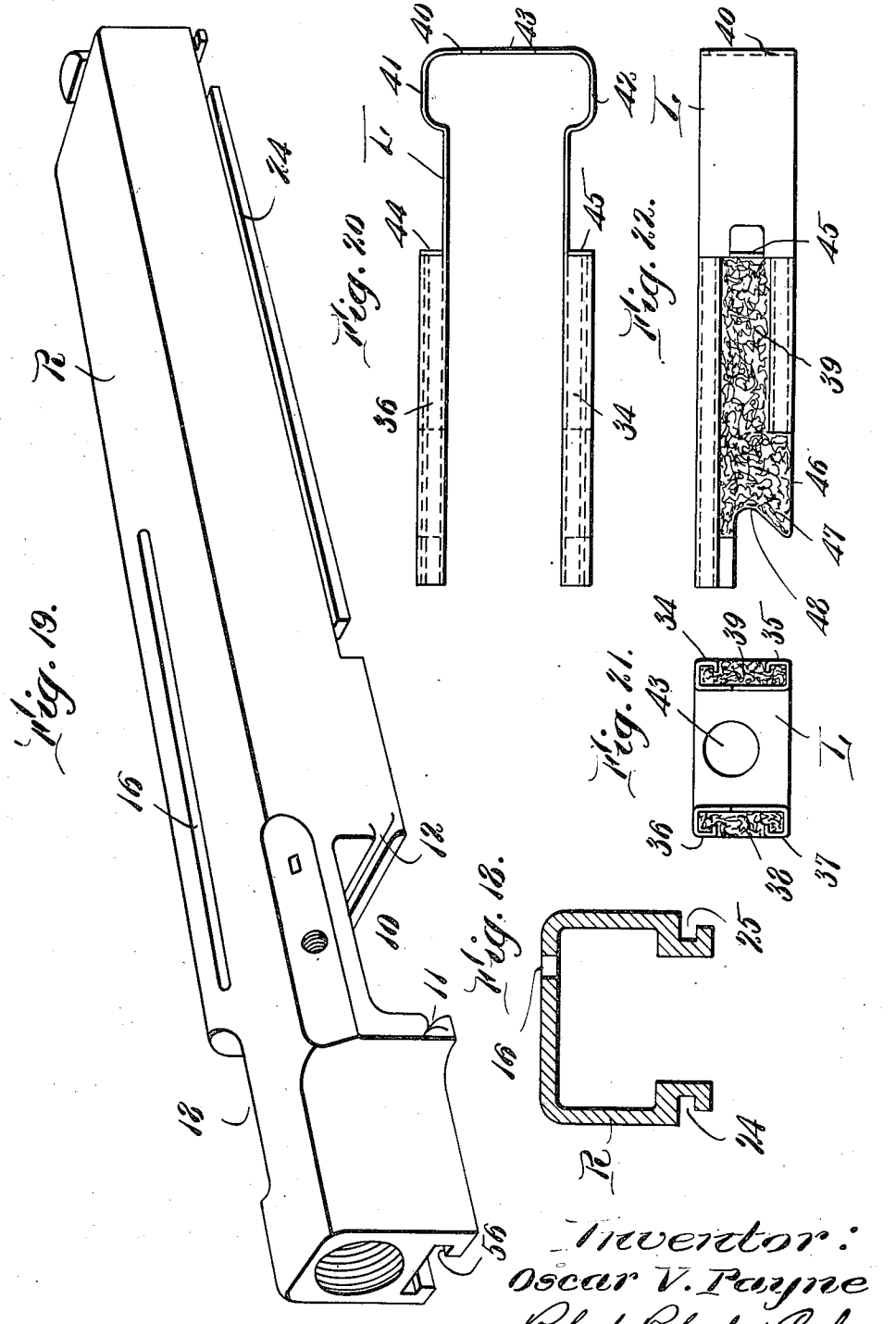
5 SHEETS—SHEET 5.



Inventor:
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UNITED STATES PATENT OFFICE.

OSCAR V. PAYNE, OF CLEVELAND, OHIO, ASSIGNOR TO AUTO-ORDNANCE CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

FIREARM.

1,357,208. Specification of Letters Patent. Patented Oct. 26, 1920.

Application filed May 15, 1919. Serial No. 297,283.

To all whom it may concern:

Be it known that I, OSCAR V. PAYNE, a citizen of the United States of America, and resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Firearms, of which the following is a specification.

This invention relates to firearms and more particularly to the general frame construction of hand firearms, this application being a companion to my copending applications Serial No. 282,642 filed March 14, 1919, Serial No. 297,282, and Serial No. 297,284, the last two applications being filed on even date herewith.

The object of the invention is to produce a firearm which is light and simple in construction, which may be quickly and easily assembled or disassembled without the use of tools, which is convenient and reliable in use, which is relatively small and compact, and which is balanced so as to be accurate but not tiresome in firing.

In one aspect the invention comprises a receiver having a longitudinal bolt chamber therein which is reduced in cross-section at its forward end and which has a transverse opening at one side of the reduced portion of the bolt chamber adapted to receive a cartridge magazine in position to deliver cartridges to the reduced portion of the bolt chamber. By reducing the cross-section of the forward end of the bolt chamber, space is provided at one side thereof to receive the cartridge magazine. In order still further to increase the available space for the magazine I preferably displace the reduced portion of the bolt opening to one side of the receiver. Thus in the preferred embodiment of the invention the forward reduced portion of the bolt chamber is displaced upwardly in alinement with the upper part of the rearward portion of the bolt chamber. The transverse magazine opening is extended to at least one side of the receiver to receive a magazine from the side and it is preferably extended to both sides in such manner that the opening extends all the way across the receiver so that a magazine may be inserted or removed from either side or inserted from one side and removed from the other side. In order detachably to secure a magazine in said transverse opening one or more guides are preferably provided in the opening to cooperate with corresponding guides on the magazine.

By constructing the receiver and its associated parts in the aforesaid manner the receiver may be made substantially rectilinear with substantially uniform cross-sectional dimensions thereby facilitating the construction of the receiver and rendering the firearm more convenient to carry and use. By reducing the cross-section of the forward end of the bolt chamber and by displacing the forward end of the chamber to one side, the magazine opening and guides may be confined to the dimensions of the rectilinear receiver, thereby avoiding the provision of an extension from one side of the receiver to receive the magazine. And by making the rearward end of the bolt chamber relatively large ample space is provided for the body of the bolt, together with the associated automatic mechanism in the case of automatic guns of the character herein referred to.

By virtue of the aforesaid construction the receiver may be made of a single integral piece and as further contributing to this result the opening through which the bolt mechanism is inserted or removed is provided in the bottom of the receiver where it may be covered with the frame of the firearm, thereby eliminating a separate detachable cover for this opening. The said frame, which may carry the trigger mechanism and a grip in the case of hand guns, is preferably slidably fitted to the receiver so that it may be attached or detached without the use of tools. This is preferably accomplished by providing interfitting tongues and grooves in the opposite sides of the receiver and frame respectively and sliding the frame on the receiver from the rear.

In another aspect the invention comprises a unique correlation of the fore parts of the firearm with the aforesaid receiver. By virtue of the rectilinear character of the receiver the receiver and the barrel form a continuous structure of approximately uniform depth and width whereby the structure may be carried in a restricted space, as for example in an elongate carrying case or under an overcoat in the case of a hand firearm of the character hereinafter described. A hand

grip is disposed beneath the barrel and this grip is preferably detachably connected to the receiver by means of interfitting guides whereby the grip may be slipped into or over the receiver from the front. A tube is provided around the barrel to produce a circulation of air around the barrel for cooling purposes and to protect the hands of the user from the barrel when heated. A member is mounted beneath the barrel for holding said tube in position around the barrel. Preferably this member comprises a part of the aforesaid hand grip and has one or more lugs projecting into openings in the tube so that the tube is held in position when the hand grip is attached to the receiver. In the preferred embodiment of the invention hereinafter described the hand grip is formed of hard rubber or other composition material and is molded around a flange or other part of said member.

Another aspect of the invention involves the combination with said sliding hand grips of spring actuated plungers adapted to fit into openings in either the receiver or the hand grips and to be moved into openings in the other part to hold the sliding hand grips in place. The plungers are actuated by coil springs which surround portions of the plungers and in order to prevent the plungers and springs from becoming accidentally displaced when the parts are disassembled I contract one end turn of the spring tightly to engage the plunger and expand the other end turn tightly to engage the plunger opening. I may also provide grooves in the plungers and openings respectively to receive the said end turns.

In order more clearly to illustrate the nature of the present invention I have illustrated certain concrete embodiments in the following drawings in which—

Figure 1 is a plan view of a completely assembled firearm;

Fig. 2 is a vertical longitudinal central section of the barrel and receiver;

Fig. 3 is a side elevation of the firearm, completely assembled;

Fig. 4 is a vertical longitudinal central section of the rear end of the firearm;

Fig. 5 is a rear elevation of the firearm;

Fig. 6 is a vertical longitudinal central section of the fore part of the firearm;

Fig. 7 is a section on line 7—7 of Fig. 6;

Fig. 8 is a section on line 8—8 of Fig. 6;

Fig. 9 is a vertical longitudinal central section of a modified cooling tube and fore grip;

Fig. 10 is a section on line 10—10 of Fig. 9;

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

Fig. 12 is a perspective view of the receiver;

Fig. 13 is a vertical longitudinal central section of the receiver;

Fig. 14 is a section on line 14—14 of Fig. 13;

Fig. 15 is a section on line 15—15 of Fig. 13;

Fig. 16 is a section on line 16—16 of Fig. 13;

Fig. 17 is a section on line 17—17 of Fig. 13;

Fig. 18 is a section on line 18—18 of Fig. 13;

Fig. 19 is another perspective view of the receiver;

Fig. 20 is a plan view of a lubricating device adapted to fit into the receiver;

Fig. 21 is a front end elevation of the lubricating device; and

Fig. 22 is a side elevation of the lubricating device.

The particular embodiment of my invention chosen for the purpose of illustration comprises a rectilinear receiver R and a barrel B threaded into the forward end of the receiver, a cooling tube T surrounding the barrel B, a fore grip G′ disposed beneath the barrel, and a rear grip G disposed beneath the receiver, the rear grip G being mounted on a frame F. As shown in Fig. 3 a magazine M may be mounted on the receiver substantially equidistantly from the two grips and the grips are respectively mounted substantially centrally in respect to the barrel and receiver so that the weights of the gun and magazine are substantially equally distributed between the grips, whereby the firearm is rendered accurate in firing and is not tiresome to hold.

The receiver R is of substantially uniform width and depth throughout its length and is in general rectangular in cross-section as shown in Figs. 14 to 16. The receiver is also preferably formed of a single integral piece of metal, the inside being hollowed out to form a bolt chamber having a rearward portion 1 of large cross-section and having a forward portion 2 of reduced cross-section. As shown in Fig. 2 the bolt chamber is adapted to receive a bolt having a large rearward portion 3 and a smaller forward portion 4. Associated with the bolt 3—4 is a firing pin 5 and an automatic locking member 6, the locking member having lateral lugs adapted to fit into the oblique slots 7 in the opposite sides of the bolt chamber to lock the bolt into firing position when the gun is fired. In the rear end of the bolt chamber is mounted a recoil buffer 8 and extending between the recoil buffer and the lock 6 is a coil pressure spring 9 adapted automatically to advance the bolt into firing position. All of this bolt mechanism disposed within the receiver is fully described and claimed in my prior applica-

tion Serial No. 282,642 and further description of this mechanism is unnecessary for the purpose of this application.

Extending transversely across the receiver immediately below the reduced forward portion of the bolt chamber is a transverse opening 10 adapted to receive the magazine M (Fig. 3) in position to deliver cartridges to the forward reduced portion of the bolt chamber. As clearly shown in Figs. 12, 13, 14 and 17 the magazine opening extends all the way across the receiver so that a magazine may be inserted or removed from either side or if desired the magazine may be inserted from one side and removed from the other side, guide ways 11 and 12 being provided in the opening 10 to receive the guides 13 and 14 on the magazine.

As clearly shown in Figs. 12 to 19 the receiver is closed on both sides and at its rear end, and an opening wholly on its lower side is provided through which the bolt mechanism may be inserted or removed to or from the bolt chamber. The upper side of the receiver is provided with an elongate slot 16 through which the handle 17 may project, the handle 17 being associated with the bolt mechanism to permit the bolt to be manually retracted when desired. An opening 18 is provided at one side of the forward end of the receiver to permit fired cartridge shells to be ejected therethrough, the cartridge extracting and ejecting mechanism being described and claimed in my copending application Serial No. 297,284. In the rear end of the receiver an opening 19 is provided to receive the end 20 of buffer 8, the end 20 of buffer 8 being adapted to be inserted into the opening 19 from the inside from the bolt chamber. An opening 21 is provided in the rear end of the receiver to receive the rear sight 22′.

The frame F carries the rear grip G and the trigger mechanism, the latter being described and claimed in my copending Patent No. 1,349,345, granted August 10, 1920. The frame F is provided with interior flanges 22 and 23 on opposite sides thereof which are adapted to fit into grooves 24 and 25 in the opposite sides of the receiver R (Figs. 5, 12 and 18), the frame F being adapted to slide on to the receiver from the rear end of the receiver. Mounted in an opening 26 (Figs. 2 and 4) in the lower side of the rear end of the receiver is a plunger 27 which is provided with a projection 28 adapted to fit into a notch in the rear end of the plate 29 of frame F to hold the frame in position on the receiver. The plunger 27 is normally urged downwardly by means of a coil spring 30 and in order to slide the frame off the receiver, it is merely necessary to press the plunger upwardly against the action of the spring until the end 28 clears the member 29 of frame F. In order to prevent the plunger 27 from being accidentally displaced from the opening 26 when the frame is detached from the receiver the bottom turn of the coil 30 is tightly contracted around the projection 31 on the upper end of the plunger and the top turn is expanded tightly to engage the peripheral wall of the opening 26. In order still further to guard against the plunger and spring being accidentally displaced from the opening, grooves 32 and 33 may be provided in the plunger and opening respectively to receive the bottom and top turns of the coil spring.

In order to supply lubrication to the moving parts of the bolt mechanism disposed within the receiver I preferably provide a lubricating device such as illustrated for example in Figs. 20 to 22. This device comprises a U-shaped clip having the edges of its two arms bent over as shown at 34—35, 36 and 37 to engage lubricating pads 38 and 39. The clip is shaped to fit into the rear end of the receiver with the two arms thereof extending along the opposite lateral walls of the receiver and with the base 40 thereof fitting against the rear end of the bolt chamber. The U-shaped clip is bowed outwardly at 41 and 42 to engage the sides of the bolt chamber. An opening 43 is provided in the base 40 of the clip to receive the end 20 of the buffer 8 as illustrated for example in Fig. 2. Tongues 44 and 45 are struck-up from the arms of the clip to extend outwardly along the rear ends of the lubricating pads 38 and 39. The arms of the clip are cut away as shown at 46 in Fig. 22 so that the lubricating pads 38 and 39 project from the arms as shown at 47 in Fig. 22. The pads 38 and 39 are preferably recessed at 48 to receive lateral extending lugs on the lock 6 when the bolt mechanism is in fully retracted position. Thus each time the bolt is lubricated the lubricating pads engage the lock carried by the bolt thereby transmitting lubricant to the lock from whence it is transmitted to the other parts of the bolt mechanism as the various parts of the mechanism move relatively to each other. This lubricating device is a modified form of the lubricating device disclosed in my aforesaid application Serial No. 282,642.

The tube T surrounding the barrel B is held in place relatively to the barrel by means of enlargements 49 and 50 at the opposite ends of the barrel (Figs. 2 and 6), the enlargement 50 comprising a plurality of spaced projections 51 having spaces 52 therebetween (Fig. 7). Tube T is provided with a plurality of elongate perforations 53, and the tube projects somewhat beyond the forward end of the barrel, as shown in Fig. 6. Thus when the projectile and powder gases rush out of the forward end of the barrel air is drawn through the openings 53

in the tube T and thence through the openings 52, thereby cooling the barrel. The tube T also serves to guard the barrel when hot.

As shown in Fig. 6 the fore grip G′ comprises a horizontal plate 54 which has a guide 55 at its rearward end adapted to slide into the guide way 56 which is formed in the forward end of the receiver. The guide 55 carries a spring pressed plunger 57 adapted to seat in an opening 58 in the receiver to hold the guide 55 in the guide way 56. The plunger 57 has a shank projecting downwardly through the guide 55 and this shank is provided with a groove 59 whereby the plunger may be pulled downwardly against the action of the spring until it clears the receiver opening 58 after which the guide 55 may be withdrawn forwardly from the guide way 56. In order to prevent the plunger from being accidentally displaced when the fore grip is detached from the receiver the end turns of the plunger spring 60 are expanded and contracted respectively to engage the opening in the guide 55 and the shank of the plunger as illustrated in Fig. 11.

The member 54 of the fore grip is provided with a lug 61 adapted to fit into a notch in the rear end of the tube T to prevent the tube from rotating around the barrel. The tube T is provided with an internally threaded boss 62 (Fig. 6) into which the screw 63 is threaded to secure the fore grip G′, member 54, and tube T together. In assembling the parts the member 54 is first attached to the receiver, the tube T is then placed over the barrel from the forward end, and the screw 63 is then threaded into the boss 62.

In Figs. 9 and 10 I have illustrated a modified form of fore grip in which the member 54′, corresponding to 54 in Fig. 6, is provided with a downwardly extending flange 65 having openings 66 and 67 therein. The fore grip G″ is formed of hard rubber or other composition adapted to be molded around the flange 65 so as to unite the fore grip and member 54′ into a single piece, the hard rubber or composition extending the opening 66 and 67 to prevent the flange 65 from being pulled out of the grip. The member 54′ is provided with a lug 61′ at its rearward end, corresponding to lock 61 in Fig. 6, and at its forward end it is provided with a lug 68 adapted to extend into an opening in the tube T to prevent the tube from being withdrawn from the barrel. Thus the lug 61′ prevents the tube from rotating and the lug 68 prevents the tube from reciprocating longitudinally of the barrel. In this embodiment the lugs 68 may if desired be employed to prevent both rotation and reciprocation of the tube, in which case the lug 61′ may be omitted. To assemble the parts shown in Figs. 9 and 10 they are first placed in position shown in these figures and then moved rearwardly until the tube T surrounds the barrel and the guide 55′ is secured in the guideway 56 of the receiver.

I claim:

1. A firearm comprising a receiver having a longitudinal bolt chamber therein, the forward portion of said chamber having a reduced cross-section, and said receiver having a transverse opening at one side of said reduced portion adapted to receive a cartridge magazine, and means within said opening for supporting the magazine on the receiver.

2. A firearm comprising a receiver having a longitudinal chamber therein adapted to receive a bolt, the forward portion of said chamber having a reduced cross-section, and being in alinement with the upper part of the rearward portion of the chamber, and said receiver having a transverse opening below said reduced portion adapted to receive a cartridge magazine, and means within said opening for supporting the magazine on the receiver.

3. A firearm comprising a receiver having a longitudinal bolt chamber therein, the forward portion of said chamber having a reduced cross-section, and being in alinement with the upper part of the rearward portion of the chamber, and said receiver having a transverse opening below said reduced portion adapted to receive a cartridge magazine, said transverse opening extending laterally to one side of the receiver so that a cartridge magazine may be inserted from the side.

4. A firearm comprising a receiver having a longitudinal chamber therein adapted to receive a bolt, the forward portion of said chamber having a reduced cross-section, and being in alinement with the upper part of the rearward portion of the chamber, and said receiver having a transverse opening below said reduced portion adapted to receive a cartridge magazine, said transverse opening extending laterally to both sides of the receiver so that a cartridge magazine may be inserted from either side.

5. A firearm comprising a receiver having a longitudinal bolt chamber therein, the forward portion of said chamber having a reduced cross-section, and being in alinement with the upper part of the rearward portion of the chamber, and said receiver having a transverse opening below said reduced portion adapted to receive a cartridge magazine, said transverse opening extending laterally to one side of the receiver so that a cartridge magazine may be inserted from the side, and a magazine guide disposed longitudinally of said transverse opening.

6. A firearm comprising an elongate receiver having approximately a constant transverse dimension throughout its length and having a longitudinal chamber therein

adapted to receive a bolt, the forward portion of said chamber having a reduced cross-section and being disposed at one side of the receiver, and said receiver having a transverse magazine opening disposed on the other side of the receiver in communication with said reduced portion of the chamber.

7. A firearm comprising an elongate receiver having approximately a constant depth throughout its length and having a longitudinal chamber therein adapted to receive a bolt, the forward end of said chamber being reduced in cross-section and being disposed nearer the top than the bottom of the receiver, and said receiver having a transverse magazine opening extending all the way across the receiver beneath said reduced portion of the bolt chamber.

8. A firearm comprising a receiver formed in a single integral piece with a longitudinal bolt chamber therein, said receiver having an opening in one side through which the bolt may be inserted or removed and having a longitudinal slot in another side adapted to receive a control handle.

9. A firearm comprising a receiver formed in a single integral piece with a longitudinal bolt chamber therein, said receiver having an integral rear end closure and having an opening in its lower side through which the bolt may be inserted or removed and having a longitudinal slot in its upper side adapted to receive a control handle.

10. A firearm comprising a receiver formed in a single integral piece with a longitudinal bolt chamber therein, said bolt chamber having an integral rear end closure and having an opening in its lower side through which the bolt may be inserted or removed.

11. A firearm comprising a receiver formed in a single integral piece with a longitudinal bolt chamber therein, said receiver having an opening in its lower side through which the bolt may be inserted or removed, and a grip slidably fitted to said receiver to cover said opening.

12. A firearm comprising a receiver, a barrel secured in said receiver, a guide on said receiver, a hand grip disposed forwardly of the receiver beneath said barrel, and a guide on said hand grip adapted to interfit with said receiver guide to secure the hand grip in position beneath the barrel.

13. A firearm comprising a receiver, a barrel secured in the forward end of said receiver, a longitudinal guide on the lower side of said receiver, a hand grip, and a guide extending rearwardly from said hand grip, the two guides being adapted to interfit to position said hand grip beneath said barrel, and the hand grip guide being adapted to slide upon the receiver guide from the front.

14. A firearm comprising a barrel, a tube surrounding the barrel, and a member mounted beneath said barrel, said tube being fitted over said barrel from the forward end of the barrel and having a notch in its rearward end, and a lug on said member projecting into said notch to hold said tube against rotation around the barrel.

15. A firearm comprising a barrel, a tube surrounding the barrel, and a member mounted beneath said barrel, said tube having one or more openings therein, and said member having means projecting into said openings to hold said member against reciprocation and rotation relatively to the barrel.

16. A firearm comprising a receiver, a barrel extending forwardly from the receiver, a tube surrounding the barrel and a hand grip mounted on said receiver, said hand grip having means for holding said tube in position around said barrel.

17. A firearm comprising a receiver, a barrel extending forwardly from the receiver, a tube surrounding the barrel, and a hand grip mounted on said receiver, said tube having an opening therein, and said hand grip having a lug extending into said opening to hold the tube in position on the barrel.

18. A firearm comprising a receiver, a barrel extending forwardly from the receiver, a tube surrounding the barrel, a hand grip beneath the barrel, said receiver having a longitudinal guide therein, said hand grip having a longitudinal guide adapted to slide on said receiver guide from the front, and said hand grip having a lug adapted to extend into an opening in said tube to hold the tube in position on the barrel.

19. A firearm comprising a frame having a guide therein, a grip slidably fitted to said guide, said frame and grip having alined openings, and a spring actuated plunger disposed in said openings, said plunger being movable out of one of said openings to permit the grip to be detached from the frame.

20. A firearm comprising a frame having a guide therein, a grip slidably fitted to said guide, said frame and grip having alined openings, a plunger in one of said openings, and a coil spring disposed in said opening around a portion of said plunger to project said plunger into the other opening to lock the grip in said guide, said coil spring having one turn expanded tightly to engage the wall of said first opening and having one turn contracted tightly to engage said portion of the plunger, whereby the plunger is retained by said spring in said first opening while permitted to reciprocate therein.

21. A firearm comprising a frame having

a guide therein, a grip slidably fitted to said guide, said frame and grip having alined openings, a plunger in one of said openings, and a coil spring disposed in said opening around a portion of said plunger to project said plunger into the other opening to lock the grip in said guide, said coil spring having one end turn expanded tightly to engage the wall of said opening and having the other end turn contracted tightly to engage said portion of the plunger, whereby the plunger is retained by said spring in said first opening while permitted to receiprocate therein.

22. A firearm comprising a frame having a guide therein, a grip slidably fitted to said guide, said frame and grip having alined openings, a plunger in one of said openings, and a coil spring disposed in said opening around a portion of said plunger to project said plunger into the other opening to lock the grip in said guide, said first opening and said portion of the plunger having annular grooves therein and the end turns of said spring being respectively expanded and contracted to fit into said grooves to prevent the plunger from being accidentally displaced from said first opening.

23. In a device of the character described the combination, with two members slidably connected together, of a plunger mounted in an opening in one member so as to be reciprocated into an opening in the other member to lock the two members together, and a coil spring disposed in said first opening around a portion of said plunger yieldingly to hold the plunger in said second opening, said coil spring having one turn expanded tightly to engage the wall of said first opening and having one turn contracted tightly to engage said portion of the plunger, whereby the plunger is retained by said spring in said first opening while permitted to reciprocate therein.

24. In a device of the character described the combination, with two members slidably connected together, of a plunger mounted in an opening in one member so as to be reciprocated into an opening in the other member to lock the two members together, and a coil spring disposed in said first opening around a portion of said plunger yieldingly to hold the plunger in said second opening, said first opening and said portion of the plunger having annular grooves therein and the end turns of said spring being respectively expanded and contracted to fit into said grooves to prevent the plunger from being accidentally displaced from said first opening.

25. A firearm comprising a barrel and a receiver joined to the barrel in alinement therewith, hand grips mounted beneath the barrel and receiver respectively, and means for mounting a magazine on the firearm approximately equidistantly from the hand grips.

26. A firearm comprising a barrel and a receiver joined to the barrel in alinement therewith, hand grips mounted beneath the barrel and receiver respectively, and means for mounting a magazine on the firearm between the hand grips.

27. A firearm comprising a barrel and a receiver joined to the barrel in alinement therewith, hand grips mounted beneath the barrel and receiver respectively, and means for slidably detaching the hand grips, the grips being slidable forwardly and rearwardly respectively for detachment.

28. A firearm comprising a barrel and a receiver joined to the barrel in alinement therewith, hand grips mounted beneath the barrel and receiver respectively, and means for slidably detaching the hand grips.

29. A firearm comprising a barrel and a rectilinear receiver joined to the barrel in alinement therewith, the barrel and receiver having approximately the same length, and hand grips mounted beneath the barrel and receiver respectively, the hand grips being disposed in the central region of the barrel and receiver respectively.

Signed by me at Cleveland, Ohio, this 29th day of April, 1919.

OSCAR V. PAYNE.