

Aug. 19, 1952

J. W. O'DELL
SNOWBALL GUN

2,607,333

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3 Sheets-Sheet 1

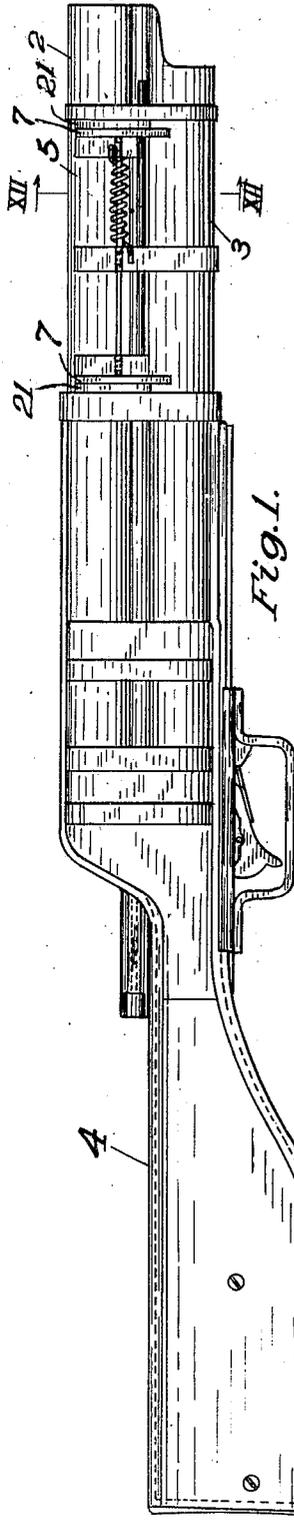


Fig. 1.

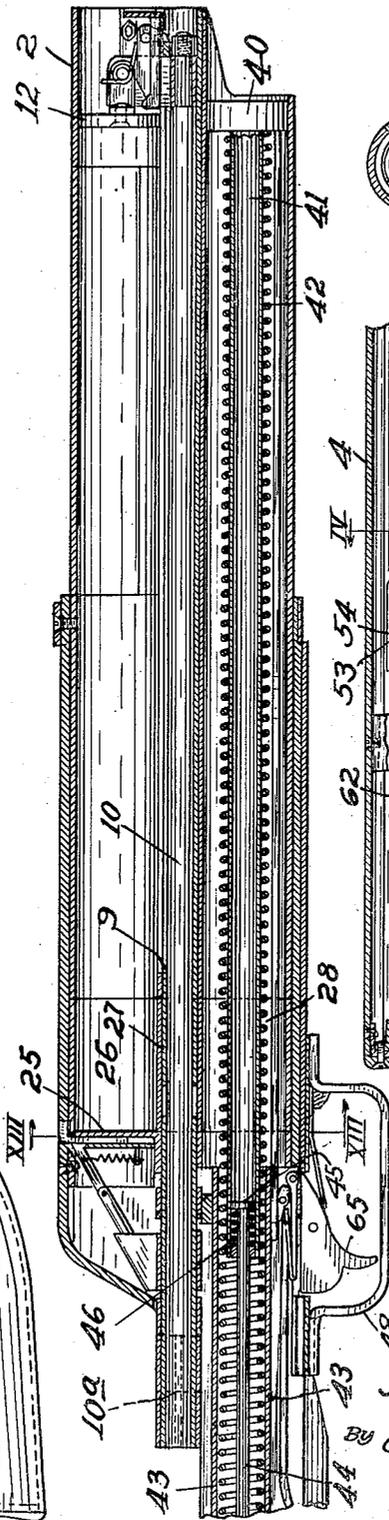


Fig. 2.

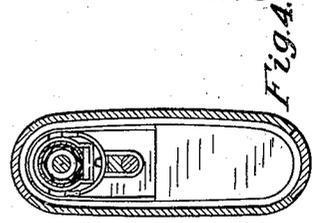


Fig. 4.

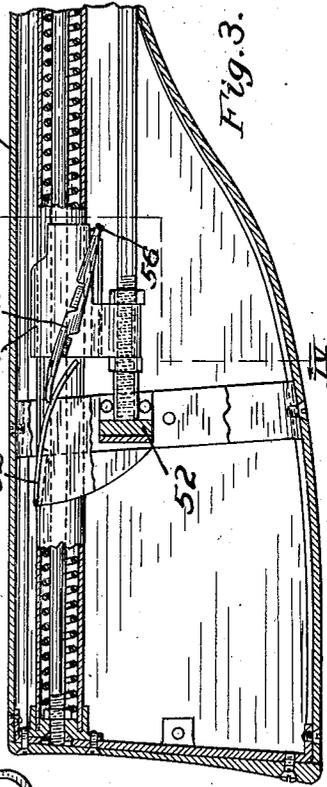


Fig. 3.

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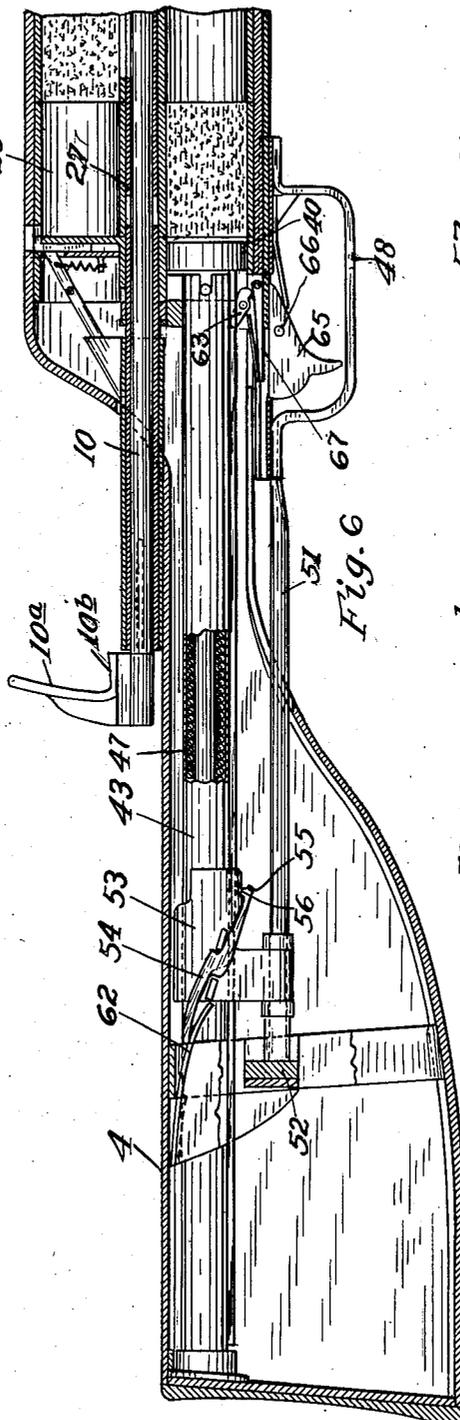
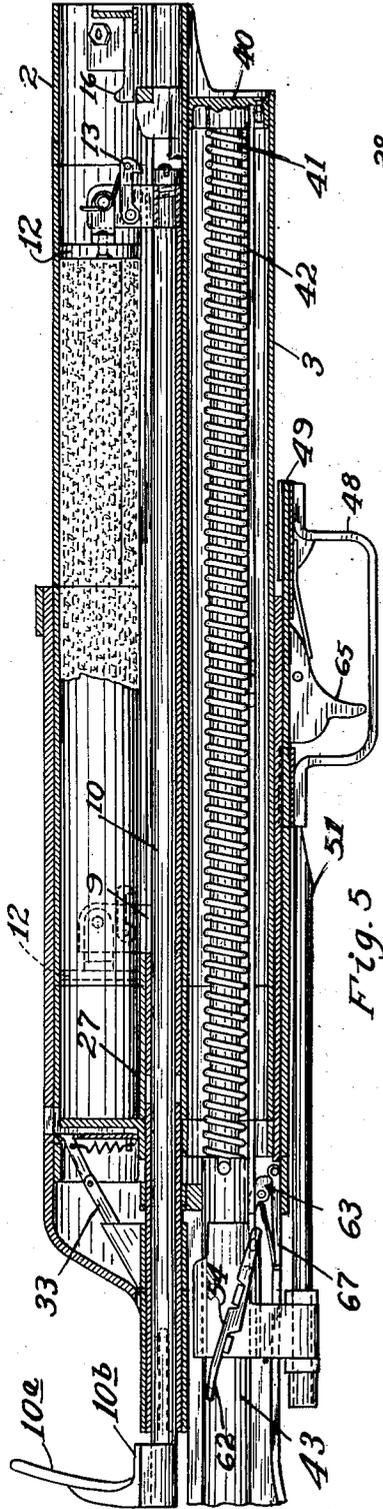
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3 Sheets-Sheet 2



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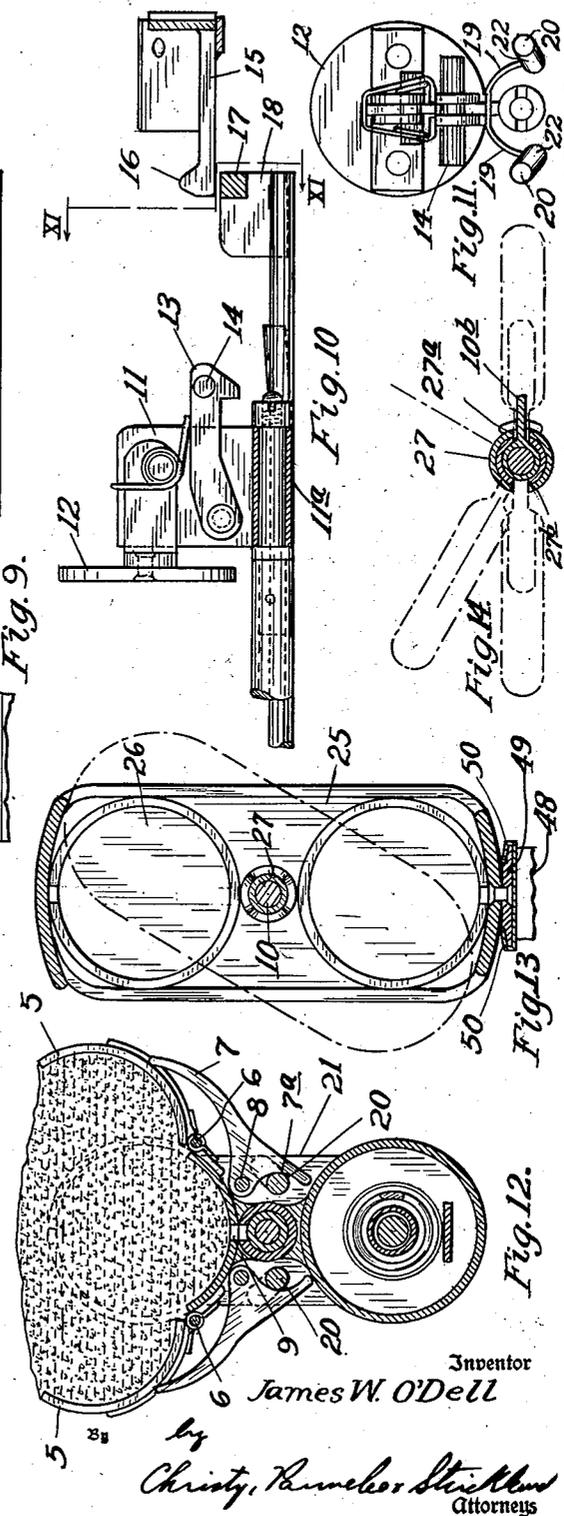
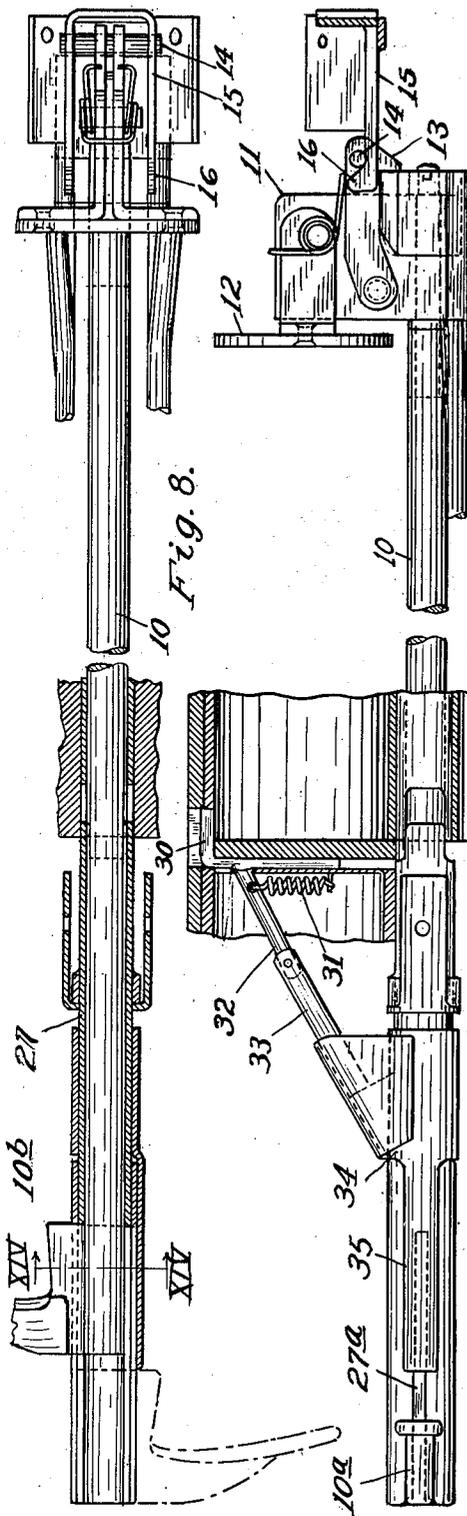
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SNOWBALL GUN

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12 Claims. (Cl. 124—27)

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This invention is for a toy gun for projecting snow pellets, and it has for its object to provide a device in the nature of a toy designed to be charged with loose snow, and to form and project the same in the form of pellets. A further object of the invention is to provide a device of this nature which will provide the user with considerable "action" and which, at the same time, is relatively simple to manufacture. It is designed to provide harmless amusement.

In its preferred embodiment, the invention provides a device having two parallel barrels, one disposed directly above the other. One of these barrels, as for example the upper one, is constructed with means to receive loose snow and compact it and force it into a charge-forming chamber or rotatable magazine member located at the rear end of the barrel in which a charge-forming member is formed. Under the control of the operator, the magazine or charge-forming chamber may be rotated from a position in axial alignment with the upper barrel to a position in axial alignment with the lower barrel. The lower barrel contains a spring-operated plunger movable from an extended position to a cocked or contracted position. When in the cocked position, the plunger is controlled by a trigger. Operation of the trigger releases the plunger so as to expel the charge from the charge-forming chamber along the lower barrel and out of the muzzle of the gun.

The invention may be more fully understood by reference to the accompanying drawings, in which:

Fig. 1 is a side elevation of a completed gun embodying my invention;

Fig. 2 is a longitudinal vertical section on a somewhat larger scale through the forward portion of the gun shown in Fig. 1, including the entire length of the two barrels and the trigger mechanism;

Fig. 3 is a complementary view to Fig. 2, showing the butt end of the gun in longitudinal section;

Fig. 4 is a vertical section in the plane of the staggered line IV—IV of Fig. 3;

Fig. 5 is a view similar to Fig. 2, but showing the snow compacting ram in a different position, and also showing the trigger mechanism moved to a forward position for the initial step of cocking the plunger;

Fig. 6 is a view complementary to Fig. 5, showing the butt end of the gun, and showing the ejecting plunger in retracted or cocked position;

Fig. 7 is a detail plan view of a strap member

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forming a part of the plunger retracting or cocking mechanism;

Fig. 8 is a fragmentary view, partly in section and partly in elevation, showing the bolt action assembly as viewed from the top, the snow compacting element being shown in elevation;

Fig. 9 is a view of the mechanism shown in Fig. 8, the view, however, being a side elevation, and it shows also the latch for holding the charge-forming chamber against free rotation;

Fig. 10 is a detail view of the front end of the mechanism shown in Figs. 8 and 9, but showing the snow compacting plunger moved away from its normal retracted position;

Fig. 11 is a transverse vertical section in the plane of line XI—XI of Fig. 10;

Fig. 12 is a transverse vertical section in the plane of line XII—XII of Fig. 1, but showing the snow-receiving gates open;

Fig. 13 is a transverse vertical section in the plane of line XIII—XIII of Fig. 2, indicating the rotation of the charge-forming chamber; and

Fig. 14 is a transverse vertical section in the plane of line XIV—XIV of Fig. 3, showing the three different positions of the bolt action.

As previously indicated, the gun comprises two coaxially extending barrels, one preferably being above the other, the upper one being designated 2, and the lower one designated 3. They are attached to a stock 4 at the rear of the gun, which stock is hollow, and is enclosed by removable plates.

The upper barrel 2 is provided near its forward end with hinged doors or gates 5, best shown in Fig. 12, in which the gates are opened out, the hinges for the gates being designated 6. These hinges are preferably spring hinges, tending to throw the gates to the open position shown in Fig. 5. When the gates are open they provide a compartment at the forward end of the upper barrel into which loose snow may be charged. They may be closed in the manner hereinafter indicated, and when closed, their curvature corresponds to the curvature of the barrel, and they constitute a part of the upper barrel.

Near each end of the gates 5 are operating fingers or levers 7 which are pivotally supported at 8, the ends of these levers slidably pressing against the exterior of the gates 5. They have a curved portion 7a for engagement with the cam surfaces to be hereinafter described.

The upper barrel 2 throughout the major portion of its length, including the portion comprised of the parts 5, has a longitudinal slot 9 along the bottom thereof. Between the upper and lower

barrels there is a longitudinally extending rod 10 forming part of the "bolt" action. This rod 10 has a vertically extending plate 11 secured thereto at its forward end, the plate 11 projecting through the longitudinally extending slot 9 so that the plate 11 can be moved back and forth along the barrel. This plate contains a snow compacting plunger 12 which is in the form of a piston that loosely fits within the upper barrel 2. The rod 10 extends to a point to the rear of the upper barrel where it is provided with an operating lever 10a by means of which the rod may be moved back and forth, and also by means of which it may be turned. The plate 11 is connected to the rod through a sleeve 11a (see Fig. 10) at the bottom of the plate, which fits about the rod and which allows the plate 11 to be moved with the rod, but which allows the rod to be turned without turning the plate 11, the slit in the bottom of the barrel along which the plate or slide 11 travels holding it always in a vertical position.

The purpose of the plunger 12 is to move from the forward end of the barrel 2 toward the rear when the rod 10 is pulled backward. It engages snow which is charged into the barrel when the gates 5 are open, and serves to push and compact this snow toward the rear end of the upper barrel.

The plate 11 carries a latching dog 13 which has a cross pin 14 passing through the outer lug-forming end thereof, and a torsion spring on the plate 11 tends to urge this latching dog downwardly.

Anchored in the forward end of the barrel 2 is a coacting latching member comprising a fixed arm 15 having a double sloped cam 16 at its innermost end. The arrangement is such that when the rod 10 is pushed to move the plunger 12 toward the front end of the upper barrel 2, the transverse pin 14 on the latching dog 13 will ride over a double sloped cam 16 and lift the dog so that the latching lug of the dog may engage cross bar 17 on a slide block 18 which is fitted into the slot 9 at the extreme forward end of the barrel 2. This slide block has two downwardly and outwardly extending arms 19 (see Fig. 11), each of which carries a slide rod 20, one extending along each side of the barrel. The slide rods 20 pass through fixed guide plates 21 which extend between the upper and lower barrels, and each of these rods has a cam thereon, designated 22. When the slide block 18 is moved forwardly along the barrel as far as it will go, which is the position shown in Figs. 5 and 10, the rods 20 are in the position shown in Fig. 12 and the cams 22 are out of engagement with the levers 7 for closing the doors 5, so that the spring hinges are free to open the gates out to the position shown in Fig. 12. When the plunger 12 is shoved forward to the forwardmost end of the upper barrel, the plate 11 will engage the block 18 and push it toward the front end of the barrel, and at the same time the latching dog will engage the part 17 in the manner hereinbefore described. When the plunger 12 is next pulled to the left or toward the stock of the gun, the slide block 18 will be pulled along with the plunger assembly 11-12 for a short distance until the cross pin 14 on the latching dog rides in the reverse direction up the double sloped cam 16 to lift the latching dog clear of the cross piece on the block 8 and thereby disconnect the slide block 18 from the slide plate 11. Thus while the plunger 12 has a relatively long stroke along the barrel 2, the arrangement is such

that the slide block 18 which operates the rods 20 with their cams 22 moves only a short distance, say about an inch, which is all that is required to cause the cams 22 to allow the doors 5 to open or to close. It will be understood that when the cams 22 move toward the left, when the plunger is moving toward the left to compact the snow, these cam surfaces bearing against the surfaces 7a of the lever 7 rock the lever 7 to close the doors 5, but when the plunger 12 is shoved all the way forward, the cams 22 will then be clear of the portions 7a of the levers, and the parts will assume the position shown in Fig. 12.

The mechanism so far described provides an upper barrel with doors which may be opened to permit the charging of snow, but which will be closed when the compacting plunger is moved in a direction to compress or compact the snow. It provides an arrangement wherein the compacting plunger can be moved back and forth in the upper barrel without opening the doors 5 after they have been closed, unless the plunger is moved sufficiently far toward the front to effect engagement between the plate 11 and the slide block 18.

At the rear end of the barrel 2 there is a rotatable magazine designated generally as 25. It has an upper cup or chamber 26 which forms in effect the rear end of the upper barrel 2. Its relation to the upper barrel is best seen in Fig. 2. This member 25 is carried on a sleeve 27 through which the rod 10 is slidably passed. The member 25 has also a lower chamber 28 which normally forms a continuation or section of the lower barrel 3, but upon rotation of the magazine the position of chambers 26 and 28 are transposed. Both barrels are of the same diameter. It will be noted that the inner or left-hand end of the slot 9 in the bottom of the upper barrel (see Figs. 2 and 5) extends almost to the charge-forming or transferring chamber 26 so that the plunger 12 can move clear over to the dotted line position shown in Fig. 5. Thus the plunger 12 is used to push the snow into the charge-forming and transferring chamber 26 in the rotatable member 25.

In operation the operator usually manipulates the gun by charging snow into the front end of the barrel when the gates are open, then pulling on the rod or bolt handle 10 rearwardly to cause the plunger 12 to push this snow toward the left-hand end of the barrel and compact it in the chamber 26. He may repeat the operation several times until a substantial part of the entire length of the upper barrel is filled with compacted snow. By working the rod or bolt 10 back and forth repeatedly, he can compact the snow to greater density.

When it is desired to transfer a charge from the upper magazine into a position to be fired, the member 25 is rotated to reverse the position of the chambers 26 and 28 as is shown in Fig. 6, this being done when the other parts of the gun to be hereinafter described are in the position shown in Fig. 6. When this has been accomplished, the filled charge-forming chamber 26 then lines up with the rear end of the lower barrel and forms a continuation of it, and the chamber 28 is in line with the upper barrel and forms the rear end of it.

Rotation of the barrel from one position to the other is effected in the following manner:

The sleeve 27 at the center of the rotatable double-chambered member 25 extends rearwardly beyond what would normally constitute the breach portion of a conventional gun. The pro-

jecting rear end of this sleeve has two slits at diagonally opposite points, the position of these slits being perhaps best seen in Fig. 14. The operating handle 10a for the bolt has a thin web portion 10b that may be entered and slid along either of these two slots. The slots in the sleeve 27 are designated 27a and 27b. When the operating handle 10a is retracted beyond the end of the sleeve 27, it is of course free to slide back and forth and to be turned, and the only effect of moving it back and forth is to move the plunger 12, and the turning effects no purpose. However, if it is entered in one of the slots 27a or 27b and then turned, it transmits a turning movement to the magazine 25. The handle 10a thus serves not only to operate the snow-compressing plunger, but also as the bolt mechanism to rotate the magazine.

In order to keep the magazine from free rotation, there is a latch mechanism. This latch mechanism comprises a radially movable detent 30, best shown in Fig. 9, which as viewed in Fig. 9 may be moved up and down. When it is down, it engages a notch in the rear end of the outer wall of the chamber 26, and serves to keep the rotatable magazine member from turning. When it is lifted clear of this notch, it does not interfere with the turning of the magazine. This latch is provided with a spring 31 that normally pulls it downwardly as viewed in Fig. 9 to keep it in latching position. It is provided with a thrust arm 32, by means of which it may be lifted to the released position. This thrust arm is connected to a toggle lever 33 which is mounted on a sleeve 34 that is concentric with the sleeve 27 and in which the sleeve 27 is rotatable. The sleeve 34 has an extension 35 that projects along the slot 27a. The arrangement is such that when the handle 10a is pushed along the slot 27a to bring it into a position to rotate the magazine, it will be pressed against the extension 35, and the longitudinal movement of the member 35 and the sleeve 34 will cause the latch 30 to be lifted to its released position. The extension 35 also forms a stop to limit the forward motion of the bolt action, so that when the lever 10a moves along this slot, it cannot advance far enough to cause the opening of the doors 5. Once it has been released, the turning movement previously described can be effected, and when the magazine has been rotated 180° the latch may again move into latching position. It will be noted that the extension 35 on the sleeve 34 is in a position to project along only one of the slots, and there is no corresponding extension over the other slot. This is necessary so that when it is desired to push the bolt mechanism all the way forward to open the snow-charging gates at the front of the upper barrel, the bolt handle 10a can travel along the other slot and not operate the latch-releasing mechanism just described. In traveling along this other slot the detent latch 30 is not operated by the bolt action.

Through this mechanism, including the rotatable magazine, charges of snow may be transferred from the upper chamber in which they are compacted into the lower barrel from which they are fired.

The "firing" mechanism is a plunger which pushes the pellets of snow at high speed along the lower barrel 3. I have found that for the successful propulsion of snow, the propelling plunger must push the snow throughout the length of the barrel. A short, quick stroke, such as is used in an air rifle to give momentum to a

lead projectile, would tend to disintegrate a snow ball, and it is necessary that the propelling means for a snow ball be more in the nature of a catapult which shoves the charge of snow at high speed for a considerable distance along the barrel. It is necessary that the plunger so used can be retracted to a point where it is clear of the rotating magazine, otherwise the magazine could not be rotated to transfer a charge from the upper barrel to the lower one. It is also necessary, as above indicated, that the plunger have a relatively long travel. My invention provides a plunger which can be so retracted to clear the rotatable magazine, and wherein a "pump" type of mechanism, simulative of that used in certain types of repeating fire arms, is used to retract the plunger.

In the drawings there is shown a snow propelling plunger 40 at the end of a tubular rod 41, the plunger 40 and the rod 41 being centered in the lower barrel 3. Fig. 2 shows the plunger in the outer or fired position, whereas Fig. 6 shows the plunger in its retracted or cocked position. Around the tubular piston rod 41 is a compression spring 42. This compression spring extends not only the full length of the tubular stem or rod 41, but also extends along the inside of a fixed tube 43 that is located in the butt or stock of the gun. Inside the tube 43 is a fixed rod 44 that has a head or abutment 45 at its forwardmost end. This head or abutment 45 is slidably fitted in the tube 41 to provide a guide for the rearmost end of the tube 41. There is a rear shock absorbing spring 46 between the abutment 45 and the abutment element on the left-hand end of the tube 41.

The pump mechanism for cocking the plunger, i. e., for moving it from the position shown in Fig. 2 to the cocked position shown in Fig. 6, requires two operating strokes in the particular gun shown. This pump mechanism includes the trigger guard 48 at the bottom of the lower barrel. The bottom of the lower barrel has a strip of metal 49 secured thereto (see Fig. 13). The trigger guard 48 just referred to has inwardly-turned edges 50 that embrace the edges of the strip 49 so that the strip 49 provides a slide for the movement of the trigger guard therealong. The trigger guard has a rod 51 attached to the left-hand end thereof as viewed in Fig. 6, which rod extends into the stock or butt of the gun. An abutment 52 limits the movement of the guard 48 toward the left as viewed in Fig. 6. The rod 51 inside the stock carries a member 53 which surrounds the tube 43 and is slidable thereon. The member 53 carries a U-shaped lever-like member having two arms 54, one arm coming up each side of the member 53, there being a cross bar 55 with an upwardly-projecting barb or tongue 56 thereon at the center thereof.

There is a metal strap 57 (see Fig. 7) which is attached to the plunger 40, and which extends along the rod 41 below the spring 42. It is provided with two slits 58 and 59 and two square holes 60 and 61. When the pump, including the trigger guard 48, is moved forward to the position shown in Fig. 5, the barb or tongue 56 will snap under the solid part of the rod 57 and catch against the cross portion 57a forming the rear end of the slot 58. Then as the pump mechanism is pulled back or pulled to the left, the plunger 40 will be drawn to the left. This movement to the left will continue until the end of the rod 51 hits the abutment 52. At the same time the free end of the U-shaped lever 54 will ride up a fixed cam 62 in the butt of the gun, tripping the lever

so as to disengage the barb or tongue 56 from the opening 58. The plunger would then be free to spring back to its original position, except for the fact that a holding pawl 63 (see Fig. 5) snaps up into the square opening 60 in the strip 57 and prevents the strip 57 from moving toward the right. Since the strip 57 is attached to the plunger and provides the means for operating the plunger to the left, it follows that the plunger is thereby held against the pressure of the partly compressed spring. The pump mechanism is again shoved forward to the position shown in Fig. 5 and this time the barb 56 will catch against the surface 57b forming the end of the slit 59 in the strip 57. Then as the pump is again pulled back to the left, the plunger will be drawn further to the left to further compress the spring until it will reach the position shown in Fig. 6, at which time the lever 54 will again be tripped to disengage the tongue 56 from part 57b of the strip 57, but at the same time the spring detent or pawl 63 will snap up into the opening 61 and hold the plunger in the retracted or cocked position.

The trigger which moves with the trigger guard includes a trigger lever 65 with a finger-engaging extension. This lever is pivoted at 66. When pressure is put on it, it tends to swing inwardly and upwardly to contact a second lever 67. The lever 67 bears against the nose of the pawl 63 in such manner that when the lever 67 is pushed upwardly by operating the trigger, the pawl 63 is rocked to disengage the pawl from the hole 61. Thus the pressing of the trigger releases the cocked plunger, and it will move forward with great velocity.

As soon as one charge has been expelled, the operator may pump the cocking mechanism twice and retract the firing piston. Then he may pull back on the bolt mechanism, including the lever 10a, to cause some of the compressed snow in the upper barrel to be pushed back into the magazine chamber. Then he thrusts the bolt forward, projecting it into the proper slot, turns it through an angle of 180°, transferring the next charge of snow into position, and is ready to again fire the gun. The upper barrel is long enough to contain enough snow to form several charges or pellets, so that several pellets may be fired in rapid succession.

The pumping of the gun to cock the plunger, and the sliding and rotating of the bolt mechanism both simulate in their general operation the operation of other types of fire arms, giving the operator the pleasure of performing the various manipulations. The further manipulation of shoving the bolt mechanism all the way forward to open the barrel and allow a new charge of snow to be put in place is not only unique, but enhances the value of the gun from the standpoint of pleasure derived from its use.

Pellets may be propelled with considerable accuracy over an appreciable distance, making the toy an ideal adjunct for snow battles and similar sports. The pellets are not compacted to a point where they are dangerous or likely to be injurious to a person should he be struck by one.

The gun is designed so as to be manufactured largely from stock materials or from simple stampings or die castings.

The simple sequence of operations is (1) shoving the bolt action all the way forward with handle 10a in slot 27b to move the compacting plunger to the front end of the barrel 2 and open the gates 5; (2) charging loose snow into the barrel

2 through such open gates; (3) pulling back hard on the bolt action to close the gates or doors 5 and pull the plunger 12 rearwardly to compact the snow; (4) pumping the cocking mechanism twice to cock the plunger; (5) shoving the bolt action forward 180° from the position where it was first shoved forward and turning it through an arc of 180° to rotate the magazine; and (6) firing the gun. Because the barrel 2 holds sufficient snow to make several pellets, succeeding action does not require the bolt mechanism to be shoved far enough forward to cause gates 5 to open, and the bolt is merely pulled back until snow previously charged into the magazine is pushed into the magazine or charge-forming chamber.

While I have shown and described a present preferred typical construction, it will be understood that the gun may be constructed in various modified ways to embody the novel action and construction herein contemplated, and my invention is not confined to the exact construction and arrangement of parts herein specifically described.

I claim:

1. A snow gun comprising a barrel, a magazine having a charge-forming chamber therein mounted at the rear end of the barrel, said magazine being movable to shift the chamber from a charge-receiving position to a position where it is in alignment with the barrel, a charge-projecting means movable through the chamber and along the barrel and retractable to a position back of the magazine, and a support for the barrel, magazine and charge-projecting means.

2. A snow gun as defined in claim 1, wherein the chamber of the magazine is a cylinder of substantially the same diameter as the barrel so as to contain a cylindrical charge of snow.

3. A snow gun as defined in claim 2 wherein there is a snow-holding barrel connected with the frame and which registers with the chamber of the magazine when said chamber is in charge-receiving position, and means for moving snow from the snow-holding barrel into the chamber.

4. A snow gun as defined in claim 3 in which said last-named means also constitutes means for moving the magazine chamber from a charge-receiving position to a position in line with the first barrel.

5. A snow gun as defined in claim 4 wherein the snow-holding barrel has a hinged closure thereon near its forward end remote from the magazine, said snow-moving means including a plunger and an operating bolt therefor movable along said snow-holding barrel, and means on the plunger and bolt for selectively operating said hinged closure.

6. A snow gun comprising a supporting structure having a barrel secured thereto and projecting forwardly thereof, a magazine rotatably mounted in the structure at the rear of the barrel and having a plurality of cylindrical charge-forming chambers therein of substantially the same diameter as the barrel, means for rotating the magazine to bring the charge-forming chambers successively to a position of alignment with the barrel, a spring-actuated plunger carried by the support movable from a cocked position rearwardly of the magazine through a magazine chamber into the barrel, means for cocking the plunger, and trigger means for releasing the plunger.

7. A snow gun as defined in claim 6, wherein there is a second barrel on the frame that extends along the first barrel and which is positioned to

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register with another chamber in the magazine when one chamber is aligned with the first barrel, said second barrel being a snow-holding barrel, and plunger means operable in the second barrel for moving snow rearwardly through the barrel into the magazine chamber which is in registry therewith.

8. A snow gun as defined in claim 7, wherein there is a sliding and rotatable bolt for moving said plunger, and means selectively operable by said bolt for rotating said magazine.

9. A snow gun comprising a supporting structure, a snow-compacting barrel mounted thereon, a snow-projecting barrel extending along the first barrel, a rotatable magazine in the frame at the ends of said barrels having a pair of cylindrical chambers therein so positioned that one chamber registers with one barrel when the other chamber registers with the other barrel, means for rotating said magazine to reverse the positions of the chambers thereof, a spring-plunger being movable between an extended position where it is forward of the magazine to a cocked position where it is retracted back of the magazine to permit rotation of the magazine, said plunger being movable through the chamber of the magazine when it is released from cocked position, and a plunger in said first barrel movable therealong for propelling snow along said barrel into the magazine chamber which is in registry with said first barrel.

10. A snow gun as defined in claim 9, wherein said last-named plunger has an operating rod extending rearwardly through the axis of rotation of the magazine, the rear end of said rod being accessible back of the magazine and having an operating handle thereon.

11. A snow gun as defined in claim 9 having a spring for moving the plunger forward, said gun having a slide thereon for retracting the plunger and trigger means for holding the plunger in retracted cocked position.

12. A snow gun comprising a supporting structure, a snow-compacting barrel secured thereto, a projecting barrel extending along the first barrel in fixed relation thereto, a rotatable maga-

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zine at the end of both barrels having a chamber therein movable from a charge-receiving position in registry with the first barrel into alignment with the second barrel, means for rotating said magazine to shift said chamber from one position to the other, a spring-operated plunger in the second barrel, said plunger being movable between an extended position where it is forward of the rotatable magazine to a cocked position where it is retracted back of the magazine so as to permit rotation of the magazine, a slide mechanism for retracting the plunger in the second barrel to the cocked position, a pawl mechanism on the slide for engaging the plunger for cocking it, a catch mechanism for holding the plunger in intermediate position, and a trigger mechanism for holding and selectively releasing the plunger when it has been fully retracted.

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