

Primer
on the
Knowledge and Handling
of the
Swiss
R e p e a t i n g R i f l e
Model 1889.

Compiled by Colonel R. SCHMIDT, Director of the Federal Arms Factory
in Bern.

IV. Printing.

Edition approved by the Swiss Military Department.

[logo]

Bern.

Schmid, Francke & Co.

(formerly J. Delp)

1892

Contents.

Federal order concerning introduction	3
General properties	5
Illustrations (with color plate)	8
Individual parts. Nomenclature	9
Disassembly and assembly	10
Explanation of the individual parts and of the cartridge	12
Function of the mechanism	23
Handling and maintenance	29
Main dimensions and weights	34
Characteristics and performance	36

Federal Order

concerning

the Introduction of New Small Arms.

The Federal Assembly of the Swiss Confederation,

on 24/26 June 1889, after examining a report of the Swiss Federal Council of 19 June 1889, gives the following

Order:

Art. 1.

For the infantry of the mobile troops and of the stationary troops, as well as for the cavalry, the depot services and the engineers of the mobile troops, new small arms according to the sample rifle presented by the Rifle Commission are introduced with the official designation:

Swiss Repeating Rifle

Model 1889.

General Properties.

In its overall properties, the Swiss Repeating Rifle Model 1889 fulfills modern requirements to a high degree. With advantageous ballistic performance, it is a rapid-firing single loader thanks to its bolt- and repeating system but with the use of the magazine it is a repeating rifle, capable of a high rate of fire without interruption and very quickly readied again for repeating fire after giving off the first 13 shots. For example, there were fired:

in the period of one minute,

single load	aimed shots	20,
with use of the magazine	“ “	30,
rapid fire (mechanical performance)	“	40.

The loading motions (with single fire, also laying the cartridge into the loading space) can be accomplished without taking the rifle from the shouldered position, whereby rapid fire (with magazine use) is especially facilitated.

At a normal 4,3 kg, the weight of the rifle is at the minimal limit for weight, since the effect of the shot on the movement of the rifle does not yet impair its precision performance.

The overall length of the rifle permits shooting while standing; the length of the barrel ensures the full exploitation of the propellant's power.

In shouldered position, the rifle lies in equilibrium on the left hand; disadvantageous influences of muzzle-heaviness or shifting of the fulcrum are thereby avoided and speedy target engagement and certain target-keeping as well as an unencumbered trigger squeeze are substantially facilitated.

The upper part of the stock (hand guard), which covers the barrel from the rear sight to the front sight, limits the "shimmering" which impairs aiming and permits grasping the rifle wherever desired at all times, for example, even when transitioning to its use as a thrusting weapon after the barrel is heated through rapid fire.

A surrounding air space is left between barrel and stock, disadvantageous effect of the stock upon the barrel avoided, the latter also kept free in the stock so that the extension of length arising through its heating can take place without hindrance and the precision of shot is not impaired (see also "stock").

The material of the metal parts is "steel," blued a solid black

in its finished condition according to a new process, except for the installed wood screws of iron and the mounting sleeve of nickel silver.

Trigger pull (take up or let off) is regulated by the two-stage effect of the trigger (in the German manner) in such a way that with uninterrupted pressure on the trigger its pull is very low (1,55 kg). Through use of the two-stage effect, the sear is drawn partway up to the first stopping point, so that for release of the striker mechanism (discharge) it requires still only a supplementary, weak, second pull of 800 g. Thus for so-called fine shooting, the complication of a hair trigger or double trigger is no longer justified.

The possibility of uncocking, recocking and setting the safety of the loaded weapon is considered in a simple and sure manner. The individual parts of the weapon are designed sturdily and purposefully for exact fabrication and interchangeability from weapon to weapon.

Thereby also the depot reserves, the store of replacement parts to be carried with the troops, the tasks of the battalion armorer, etc. enjoy noteworthy simplifications.

In particular, with the design of the bolt- and repeating system, provision has been made for the greatest possible simplicity, solidity and ease of maintenance, guided by the conviction that:

the more easily and quickly the rifle-bearer can become familiar with the same, the more productive a use can be expected of it.

Illustrations.

The illustration of all individual parts (plate) is included for the detailed description of this rifle for training purposes.

Infantry Rifle Model 1889	Fig.
Barrel with rear sight, receiver and magazine	A.
Bolt- and repeating system R. Schmidt	B.
Bolt, seen from above	C.
“ uncocked, longitudinal section, horizontal	D.
“ cocked, “ “ , vertical	E.
Striker mechanism	F.
Magazine	G.
Cartridge loader	H.
Cartridge	I.
Bayonet [Tr. note: literally, “dagger”]	K.
Accessories	64.
	66 – 68.

Individual Parts, Nomenclature.

Fig.		No.
A	The rifle	
B	Barrel 1 with mounting sleeve 2, front sight base 3 with screw 4 and front sight 5	5
	Rear sight base 6, screw 7, leaf 8, spring 9 and screw 10	5
	Receiver 11 with sear pin 12, ejector 13 with screw 14, bolt latch 15 with spring 16 and pin 17, sear 18 with sear spring 19, trigger 20 with pin 21	11
C	R. Schmidt bolt and repeating system	
D	Bolt , seen from above	
E	“ uncocked, longitudinal section, horizontal	
F	“ cocked, “ “ vertical	
G	Striker mechanism	
	Bolt cylinder 22 with head 23, extractor 24, bolt sleeve 25, cap 26, striker 27, striker spring 28, firing pin 29, bolt handle 30 with knob (two halves) 31, knob screw 32 with nut 33	12
	Stock and furniture	
	Stock 34 with hand guard 35 and ferrule 36, band spring 37 with nut 38, trigger guard plate 39 with trigger guard 40, magazine lever 41 with screw 42, trigger guard plate screws, forward 43, middle 44 and cross screw 45, rear trigger guard plate screw 46, sling swivel base together with sling swivel and pin 47 a. b. c., 2 sling swivel base screws 48 and 49, butt plate 50 with 2 screws 51 and 52, lower band with screw and collet, sling swivel and pin 53 a. b. c. d. e., upper band – upper- and lower part 54 and 55, stacking rod 56 with pin 57, hinge pin 58, upper screw 59 and pin 60	33
H	Magazine 61 with spring 62 and follower 63	<u>3</u>
		<u>69</u>
I	Cartridge loader	
K	Cartridge	
	Bayonet 64 with sheath 65	
	Accessories. Pull-through 66, cleaning stick 67, muzzle cover 68, screwdriver (in pocket knife)	

Disassembly and Assembly.

Push the magazine lever *41* completely down, lift out the magazine *61* (together with spring *62* and follower *63*); press down the bolt latch *15* and draw out the b o l t.

After this, the barrel can be cleaned and inspected.

Disassembly of the Bolt.

Set the wing of the striker *27* on the base of the cylinder cap *26*, between the two openings shown in Fig. *26*, after which the bolt's individual parts can be separated as follows:

After turning the bolt sleeve *25* to the right, slide the handle *30* forward and lift it out. Uncock the bolt. Screw out the striker mechanism and separate its individual parts firing pin *29*, striker spring *28*, striker *27*, and cap *26*. Take off the bolt sleeve *25*, disengage the extractor *24* to the left and lift it out, screw out the bolt head *23* and the bolt cylinder *22* remains.

(This disassembly takes place without tools, without any kind of effort or special attention and in barely about one-half minute's time.)

When **assembling the bolt** (in reversed sequence), after screwing in the striker mechanism, the wing of the striker 27 is again set upon the base of the cap between the openings shown in Fig. 26, then the handle 30 is so inserted that its forward post reaches into the forward end of the slots in the bolt sleeve and in the cylinder, and by drawing back the handle its rear flange is engaged in the slot of the cylinder cap (Fig. 26). With the bolt sleeve turned completely to the left (Fig. *D*), admit the striker into one of the slots of the cylinder cap, through which all bolt parts are held together. Bring the bolt into the receiver and with an outright shove (without having to press the bolt latch down as when taking the bolt out) guide it into place.

Dismantling further individual parts of the weapon is limited to exceptions and includes the following parts: upper band 54, lower band 53, hand guard 35, forward 43 and middle 44 trigger plate screw and cross screw 45; from the receiver 11: ejector 13 with set screw 14, bolt latch 15 with spring 16 and screw 17, sear 18 with

spring 19 and trigger 20 with pin 21; from the barrel with rear sight: rear sight screw 10, rear sight leaf together with springs 8 and 9.

These furniture parts remain on the stock: band spring, plate with magazine lever, sling swivel base and butt plate.

Explanation of the Individual Parts and of the Cartridge.

The barrel, Fig. *B*, whose bore receives the charge, requires certain characteristics with regard to its material (special steel) according to particular specifications about resistance capacity to bearable gas pressure, workability, elasticity, etc.

Accordingly, its dimensions including the rear part (chamber) are strengthened.

By means of the spiraled grooves of the bore, the drilling motion rotating about its axis is imparted to the bullet.

Its bore is widened at the muzzle to avoid disadvantageous damages through bumping and the like, then is of uniform caliber;

the cartridge chamber is widened at the rear end and provided with the cutout for the protrusion of the extractor claw.

The rearward strengthening of the barrel ends with a threaded bulge for screwing on the receiver. In front of the bulge is the support *b* upon which the rear sight is pressed crosswise and fastened by means of cross pin 7; in front of the rear sight support is flange *a* as catch for the ferrule 36 of the hand guard 35.

The front sight base 3 is pressed on nearest the muzzle and held in place with the screw 4; the front sight 5 is slid crosswise into the front sight base. Behind the front sight, the barrel is surrounded by the mounting sleeve 2, through which its unimpeded extension in length is ensured.

Together with the front sight, the **rear sight** (Fig. 6 – 10) conveys the target direction to be imparted to the barrel. Through the rear sight's various elevation settings, the barrel is brought into the orientation necessary to impart to the bullet the lift worked out for any range, to reach the distance it is to traverse and to hit the target.

The Model 1889 rear sight is a quadrant sight for ranges out to and including 2,000 meters. The left side-piece of the rear sight base 6 bears a strengthening rib *c* with inward grooves for setting the sight leaf 8 to the various elevations. The upper edge of this strengthening rib is furnished with the distance marks and numbers in hundreds of meters; and this graduation is also highlighted through marks and numbers applied externally to the left side-piece of the rear sight base for the distances 300 meters (battle sight), 600, 1000, 1500 and 2000 meters.

The rear sight leaf 8 is rotatable around its *a x i s s c r e w 10*; the *r e a r s i g h t s p r i n g 9* reaches into its left edge and spreads out, sharp-edged, to snap into the grooves of the side-piece as soon as the pressure needed to elevate the leaf – applied to the grip of the spring to press the spring toward the leaf – is relieved.

The rear sight leaf set to a higher graduation can be lowered through a light blow carried out with the hand; but as a rule, for protection of the grooves, the leaf is lowered (as it is raised) under pressure on the spring.

The **receiver**, *Fig. 11*, screwed onto the barrel, serves for accepting the moveable bolt as well as the cartridge magazine. The trigger mechanism is attached to the same.

The receiver is fashioned so as to ensure a lastingly good passage for the moveable bolt; it is therefore relatively long and, for reduction in weight, is provided externally with hollow channels. Behind the barrel thread is the loading space, extended downward in the shape of a box for receiving and guiding the magazine; to this box is joined rearward the strengthening rib which ends in the receiver tang with trigger mechanism attached at the sear pin *12*.

Along its length and to the right, the receiver forms the guide housing *d* for the bolt handle *30*, with extension *e* and opening for the bolt latch *15* beneath. The ejector *13* is sunk into the receiver on the left and fixed by means of the set screw *14*.

The inside of the receiver displays the screw-shaped guides *ff* for the bolt lugs and their abutments *gg*, as well as the guide slot *h* for the stop wing of the striker.

The trigger mechanism, fixed to the sear pin in the receiver, consists of the sear 18, the sear spring 19, the trigger 20 and the trigger pin 21, the last of which serves the trigger as axis in the sear hinge.

The bolt *C.D.E.F* (cylinder or plug bolt) is the means, when open, for guiding cartridges laid into the loading space during single fire into the cartridge chamber of the barrel, to lock them within the same and to bring about the ignition of the cartridge as well as the extraction and ejection of the cartridge case. When the magazine is used, the bolt also achieves the automatic transport, in uninterrupted sequence, of the cartridges from the magazine into the barrel (repeating fire).

The bolt is assembled from the following 9 individual parts:

The cylinder 22 forms two halves along its length divided by a ring-shaped bulge. It is drilled through lengthwise for receiving the striker mechanism, whose forward movement is limited by the differing diameters of the bored hole. The hole ends in front in the male thread for

the bolt head 23. The forward half of the cylinder shows on the right side the sliding groove *i* of the bolt latch, above and somewhat to the right the surface *k*, in whose middle is the oval key-hole *l* with the two inlets *mm* for attaching the extractor and the bolt head, on the left the ejector groove *n*. Noticeable on the right of the rear half is the long hole *o* in which the cocking post of the handle slides, the float for free rotation of the bolt sleeve and at the rear, the thread for the cap.

The bolt head 23 is drilled through for the protrusion of the firing pin; on its circumference are the outlets of the surface and slots of the cylinder. The rim standing out from the recessed surface of the bolt face surrounds the base of the cartridge case.

The extractor 24 forms in front the claw for reaching into the circular groove of the cartridge case for its extraction. The oval key (at the middle of its length) serves for its attachment to the cylinder (by means of rotation). For holding in place, the forward and rear lugs enter into the inlets *mm* of the cylinder. The forward and rear portions of the extractor have a suitable resilient effect.

The bolt sleeve 25 surrounds the rear half of the cylinder. With its face abutting the bulge of the cylinder, it transmits the locking of the barrel with its two locking lugs *pp*. The slot *q*, in which the cocking post of the handle slides, begins straight in front and then goes over into the shape of a screw or helix into its rearward end which is again straight. Through this helix, the rotation of the bolt sleeve is brought about, and with it the locking. The two locking lugs *pp* are likewise fashioned in the shape of a screw, thus serving to prevent an abrupt blow to the cartridge upon “closing” and to loosen the cartridge upon “opening.”

Together, the cap, striker, striker spring and firing pin constitute the **striker mechanism**.

The cap 26 joins the striker mechanism to the cylinder by screwing on; its base has two openings, which go over into interrupted guide paths, the vertical into the longer path *r*, which allows the striker to protrude for ignition of the cartridge, the horizontal into the shorter

path *s* which, preventing this protrusion, serves as safety slot.

In the center of the base of the cap is the hole guiding the striker, above it the extension *t* with guide slot for the rear handle post.

The *s t r i k e r* 27 with head, stop wing and ring.

The *s t r i k e r s p r i n g* 28, a spiral wound from left to right.

The *f i r i n g p i n* 29, the point in front and the socket in back with bearing for the head of the striker (coupling).

(To assemble the four parts of the striker mechanism, the striker is admitted into one of the slots of the cap, the striker spring is set in place and under some pressing back of the same, the socket of the firing pin is pushed over the head of the striker.)

The *h a n d l e* 30 – 33 is the means of opening and closing the bolt through exclusively horizontal guiding in the sleeve *d* of the receiver. The face of the handle is angled downward for overcoming the bolt latch when introducing the bolt into the receiver. In its lower slot *u* slides the post of the bolt latch, limiting the rearward movement of the bolt. At the front of the handle shaft is the cocking post *c*,

sliding in the slots of the bolt sleeve and of the bolt cylinder, which transmits the rotation of the bolt sleeve around the cylinder. At the rear is the post x sliding in the slot t of the cap and the bolt knob.

By means of the furniture, the **stock** 34 joins and secures the barrel and the other rifle parts into a handy firearm.

The **hand guard** 35 (upper stock) covers the barrel between the front sight and the rear sight.

The mounting sleeve 2 is laid into the forward portions of the stock and of the hand guard to ensure that the heated barrel is free to lengthen.

(In this regard, see General Properties.)

The **furniture parts** serve for joining and fastening, and also in part for the protection of the various rifle parts, thus:

The **hand guard ferrule** 36, with 2 rivets on the rear end of the hand guard, reaches under the flange a for its fastening.

The **band spring** 37 with nut 38, recessed into the stock, holds the **lower band with sling swivel** 53 $a.b.c.d.e.$ in place.

For protecting the trigger, the **trigger guard** 40 is screwed onto the **trigger guard plate** 39 and the

m a g a z i n e l e v e r 41 with screw 42 is fastened to it; noticeable on the same is the pivot Y, the arc Z with the two notches 1 and 2.

Three trigger guard plate screws, front 43, middle 44 and rear 46, as well as the cross screw 45, serve to fasten the trigger guard plate to the receiver and stock.

The lower sling swivel with base 47 a.b.c., fastened in the butt by means of two screws 48 and 49, serves with the upper sling swivel for attaching the rifle sling.

The butt plate 50, screwed on with 2 screws 51 & 52, protects the lower end of the stock. The forward portion of the stock (upper end) is surrounded by the two-part upper band 54 & 55, with hinge pin 58, screw 59 and screw pin 60.

In place of a cleaning rod, for forming the rifle stack [Tr. note: literally, "rifle pyramid"], the stacking rod ["pyramid rod"] 56 is fastened to the upper band by means of rivet 57.

The **cartridge magazine** H 61 together with m a g a z i n e s p r i n g 62 and m a g a z i n e f o l l o w e r 63. On its right side wall, a small plate 3 with angled path is externally riveted as guide for the pivot 4 Fig. C of the magazine lever 41.

The **bayonet 64**, attachable to the rifle and safeguarded in the sheath 65, serves as sidearm.

The **rifle accessories** consist of the following items:

Pull-through 66 for cleaning the barrel interior.

Cleaning stick 67 for “ “ cartridge chamber.

Barrel cover 68 for protecting the muzzle.

Screwdriver (on pocket knife).

The **cartridge loader I** (charger), of waterproof cardboard, has for multiple durability a sheet-metal trim which at the same time forms four claws which are bent inward after filling with the six cartridges held by the loader, in order to retain the cartridges therein until they are pushed out for loading. The loader is of slight value and can therefore be thrown away but can also serve for repeated use.

The **cartridge K**.

After all trials with bullets, whose jackets consisted of copper, steel, nickel and various alloys, the Rubin-designed **armored bullet** with paper patch, Model 90, was adopted in place of the jacketed bullet on the basis of more advantageous results.

The core, of hardened lead, bears as bullet tip a steel cap (armor), which is firmly joined with the bullet by crimping; a specially fabricated paper, which is externally greased with Vaseline, serves as bullet patch.

This bullet produces lower erosion of the barrel interior, greater tolerance of the same through increased compression capacity and better precision with greater penetration.

Functioning of the Mechanism.

Single Fire.

The receiver *11* accepts the moveable bolt, whose forward and rearward guiding is accomplished by means of the handle *30*.

The exclusively horizontal guiding (straight pull) of the bolt for opening and closing causes the following functions, beginning with the moment in which a shot has been fired, the cartridge case is still in the barrel and locked therein. Upon opening, the cocking post *c* of the handle *30* first slides in the forward straight portion of the slot *q* of the bolt sleeve *25*, but then goes into the angled portion of the same, through which the

rotation of the bolt sleeve begins and the cartridge case is loosened and drawn forth about 2 mm from the cartridge chamber.

Upon guiding the handle *30* back further, its cocking post *c*, sliding in the middle, angled portion of the bolt sleeve's slot *q*, forces the sleeve to rotate so far that its locking lugs *pp* have left the abutments *gg* in the receiver *11* so that now the complete withdrawal of the bolt can take place, which is limited through the bolt's stopping at the post *st* of the bolt latch *15*.

The fired cartridge case is drawn out by the extractor *24*, stopping at the ejector *13* protruding inside the receiver, pushed down from the cavity in the face of the bolt head *23* and ejected with the cooperation of the extractor *24*.

With the rearward guiding of the handle *30*, the cocking of the striker mechanism has also been accomplished as follows: through the cocking post *v* mounted in front of the socket *M* of the firing pin, the firing pin *29* and striker *27*, which are coupled together by means of the socket *M*, are forced backward, the striker spring *28* surrounding the striker is cocked,

and this cocked condition is maintained through the cocking post ν having entered into the stop notch R of the slot q 25.

Now a cartridge is laid into the loading space. With an empty magazine, the magazine follower 63 serves the cartridge as sliding surface, but with a disengaged magazine, the cartridge lies on the cartridge borne uppermost in the magazine.

When guiding the bolt forward, the face of the bolt head 23 grasps the base of the cartridge, shoving this forward into the barrel and locking it inside. With this forward guiding of the bolt, the cocking post ν of the handle is at first released from the stop notch R of the bolt sleeve by means of the angled guide paths ff in the bolt sleeve, in which the bolt lugs pp Fig. 25 slide; the maintenance of the cocking of the striker mechanism is transferred to the sear 18 which, extending before the stop wing T of the striker, hinders its forward movement.

If the bolt is guided forward up to about 2 mm, the complete locking of the barrel takes place, in that the cocking post ν of the handle sliding in the angled slot q of the bolt sleeve forces the bolt sleeve into rotation around the cylinder

whereby the bolt lugs *pp* 25 enter in front of the abutments *gg* in the receiver. In the last moments of this movement, the cocking post *v* of the handle enters the straight portion of the slot *q* 25, absolutely impeding any rotation. The cylinder, stopping with its ring-shaped bulge at the face of the bolt sleeve, cannot creep backward; the lockup is effected and secured. The claw of the extractor 24 has stepped over the base of the cartridge case and into its groove in order to extract it after the shot. The rifle is ready to fire.

Trigger pull (take up or let off)

The sear 18 functions in the shape of a balance; its forward part is pressed downward by the sear spring 19 borne in the receiver, its rear part is always pressed upward with the stop post and trigger, so that the curve of the trigger stops at the receiver tang.

A first pressure on the trigger 20 brings about a partial lowering of the sear 18, limited by the stopping of the rear rounding of the trigger. Upon continued pressure, the sear is drawn down so far that its stop post leaves the stop wing *T* of the striker, after which, through the

freed striker spring, the impact of the firing pin 29 is carried out upon the primer seated in the center of the cartridge case and the ignition of the cartridge is brought about.

The *u n c o c k i n g* of the striker mechanism takes place by reaching with the thumb of the right hand into the ring of the striker and slowly letting it forward while pressing the trigger.

For *r e c o c k i n g*, the striker is to be drawn back by its ring; the stop post of the sear again reaches in front of the stop wing *T* of the striker.

Setting the *s a f e t y* takes place by drawing back the striker, turning it to the left and letting it move forward into the horizontal opening *s* of the base of the cylinder cap. Any functioning of the bolt and of the striker mechanism is thus blocked.

For **repeating fire**

the following individual parts go into action.

The *m a g a z i n e 61 – 63*.

This, a sheet metal box vertically moveable beneath the bolt, can easily be removed from and replaced onto the rifle. It contains 12 cartridges, which can be brought into the magazine

either one after the other through the loading space from above or 6 cartridges at a time by means of the cartridge loader; the refilling of the magazine takes place in the same manner. An escape of the cartridges from the magazine is blocked through the side walls bent inward at its opening (Fig. *H*, magazine mouth).

Shoved in from below through the trigger guard plate 39, the magazine is held in place through the magazine lever 41 joined to it. Its pivot 4 reaches into the guide path of the little plate 3 riveted on the right wall of the magazine, through which a downward push on the magazine lever 41 brings about the “lifting” (engagement) of the magazine for repeating fire, while on the other hand, an upward push on the magazine lever brings about the “lowering” (disengagement) of the magazine for single loading.

The correct height of these positions is fixed through the resilient arc *z* of the magazine lever, whose two notches 1 and 2 reach into the angle of the trigger guard plate.

No sort of dangerous manipulation is necessary for emptying the magazine; the magazine is disengaged by means of thumb pressure inward and

downward on the arc of the magazine lever 41 and lifted out of the rifle and, if desired, the cartridges are slid out directly into the cartridge pouch.
[Tr. note, below]

When reinstalling the magazine, its lever is to be in its lowest position, as upon lifting out, and the magazine fixed in place by means of a light blow of the hand.

Handling and Maintenance.

The handling of the rifle for "shooting" is explained above.

There are 3 motions for single loading: 1. opening and ejecting, 2. setting the cartridge in place and 3. closing.

There are 2 motions for repeating fire (through omission of setting the cartridge in place).

Caution.

For breech-loading rifles in general, caution requires that before any commencement of shooting, one ensure that the barrel is not plugged through cleaning material or the like; this caution is all the easier to observe, as the bolt can be removed after merely pushing down on the bolt latch and the barrel interior can be viewed.

Tr. note: The following is a more detailed instruction for removing the magazine, from the 1902 draft of INTRODUCTION, Knowledge and Handling of the Swiss Repeating Rifle Mod. 1889/96 and Mod. 1889 (for Noncommissioned Officers and Soldiers), O. & K. – Sep. 1902 – 4000 copies:

2. The magazine. For removal, hold rifle in the ready position, thumb of the right hand on the magazine lever, first and middle fingers under the magazine as support; press down the magazine lever to the first stop (engagement); press it down further so that the thumb works downward and against the magazine at the same time and thus forces the pivot of the lever out of the guide; remove the magazine; close the magazine lever. In exceptional case, disassemble magazine by sliding follower off and withdrawing spring.

Remedying possible malfunctions.

Obstruction on loading. With unpracticed handling, it can occur that during repeating fire, the motion for “closing” (guiding the bolt forward) is carried out only incompletely and thereupon – without having fired – the motions for opening and closing are repeated. The cartridge which had been left in the barrel obstructs the entry into the barrel of the second cartridge lifted from the magazine into the loading space and thereby also the guiding forward of the bolt. In this case, the magazine is simply disengaged for single fire, the bolt is closed and if repeating fire is to be continued, the magazine is again engaged.

Also, instead of disengaging the magazine, the uppermost cartridge lying therein can be pressed down with the thumb of the left hand and at the same time the cylinder can be guided over it.

Impairment of magazine function can occur if, for example, a primer has been driven out of its seat in the base of the cartridge case and sits between the walls of the loading space

and magazine. Easy to remedy after removing the magazine.

Ignition failure. Should the bolt be guided forward incompletely and the trigger pulled thereafter, the locking will be automatically completed but the blow on the cartridge weakened, which can impair its ignition. In this case, by drawing back the striker by its ring, the “cocking” is to be renewed and thereupon the trigger pull.

Extraction failure. Should a cartridge case not be extracted, the bolt is again to be guided all the way forward so that the ejector [sic] claw reaches into the groove of the case; this reaching is to be secured by pushing on the extractor head with the thumb of the left hand, then the motion for opening is to be renewed. In case of any resistance, advantage upon opening can be gained through light blows of the right hand against the handle knob.

If upon disassembly the twisting out and removal of the extractor from the cylinder cannot be carried out easily enough by hand, this can be assisted simply: by holding the cylinder in the left hand

(face to the right), one grips the extractor head at its left side by means of the screwdriver or another object and pushes to the right while lifting slightly.

Cleaning the barrel interior.

In consideration of the lesser fouling or encrustation which the new propellant leaves behind, the cleaning rod has been omitted from the rifle and replaced by a pull-through – as accessory item.

Whenever possible, two men should be active in cleaning the barrel interior by means of the pull-through. Holding the rifle at both ends, these draw the pull-through back and forth in the straightest possible extension so that a cratering out of the muzzle as well as wear on the pull-through is not unnecessarily hastened.

The adhesion of impurities, sand and the like onto patches and pull-through is to be prevented with all diligence.

When drawing back and forth, the pull-through is to be completely withdrawn each time in order to avoid its folding over in the barrel.

The weapons grease prescribed for military use best dissolves the few remnants of the new powder. For cleaning the barrel interior, therefore, the cleaning patch to be inserted into the cord of the pull-through is to be lightly impregnated with weapons grease and thereafter to be replaced with a dry patch.

Also externally, the barrel as well as the other metallic rifle parts is to be lightly greased with weapons grease.

Note. There are special regulations about inspection of the individual parts, of the entire rifle and its testing for accuracy. The component parts bear the acceptance stamp of the Federal Weapons Inspectorate; in addition, the barrel, the receiver, the bolt, the stock, the magazine and the bayonet bear matching fabrication numbers, and the rifles bear inspection numbers beginning with "one" and continuing.

Main Dimensions and Weights.

Rifle , length without sidearm. . .	m/m 1,302
“ weight without sidearm (magazine empty)	gr. 4,300
“ center of shouldered position [c.s.p.], drop beneath the extended barrel axis. . .[Tr. note, below]	“ 105
“ length of pull, from c.s.p. to trigger. . .	“ 308
“ center of gravity in front of c.s.p (magazine empty). . .	“ 530
“ distance of rear sight notch from c.s.p. . .	“ 590
“ number of individual parts according to nomenclature. . .	67
“ “ “ cartridges which the rifle contains (1 in barrel and 12 in magazine). . .	13
 Barrel , length overall. . .	 m/m 780
“ “ of line of sight (battlesight). . .	“ 656,5
“ height of front sight above the surface. . .	“ 12,95
“ diameter at the front sight. . .	“ 15,5
“ “ “ junction of thread (bulge). . .	“ 27
“ caliber, normal. . .	“ 7,5
“ grooves, concentric profile.	
“ “ number. . .	3
“ “ depth. . .	m/m 0,1
“ “ width. . .	“ 3,8
“ “ twist, 1 rotation in. . .	“ 270
“ “ direction of twist to right.	

Tr. note: “Center of shouldered position,” or “c.s.p.,” was my solution for Anschlagmitte, and it was even more problematic to find than to describe in English. Eventually I used a meter stick to measure 105 mm down from the barrel axis extended to the rear and I established a point on the butt plate about 12 mm above the top edge of the back screw. From that point I measured two other given dimensions, to the trigger (308 mm) and to the rear sight notch (590 mm), and these turned out to be correct. Interestingly, *Handfeuerwaffen Gradzug-System*, Volume 4 of the Stocker-Schmid series, indicates at page 27 that the length of pull (= Anschlaglänge) was extended 20 mm on the M1889/96 rifle: “Thus a better head- and body stance is achieved, which improves the shooting performance.” And *Swiss Magazine Loading Rifles 1869 to 1958* notes at page 55 that the M1889/96 receiver was shortened by 0.79 inch, or 20.066 mm. See also www.saami.org > glossary > stock dimensions.

Rear sight , quadrant	
“ number of notches. . .	1
“ lowest setting (battlesight) for range in meters. . .	300
“ highest elevation. . . “ “ “ “	2000
Bolt system , cylinder, straight pull.	
Magazine , beneath the bolt.	
“ cartridge capacity (in reserve). . .	12
Cartridge loader , cartridge capacity. . .	6
“ weight, empty. . .	gr. 20
Sidearm , bayonet.	
“ length, the blade extends from the barrel by. . .	m/m 298
“ the sheath. . .	gr. 430
Cartridge , length. . .	m/m 77,5
weight. . .	gr. 27.5
case , brass, with groove, centerfire.	
powder , low smoke, grain.	
“ weight of charge. . .	gr. 2
bullet , core metal, hard lead.	
“ cap metal, steel.	
“ length. . .	m/m 28,7
“ diameter, widest. . .	“ 8,15
“ weight. . .	gr. 13,7
“ wrapping, paper.	
“ lubrication, external.	

Characteristics and Performance.

Charge ratio [propellant weight : bullet weight]. . .		1:6,85
Ballistic coefficient of bullet in m/m squared. . .	gr.	0,31
Gas pressure in atmospheres. . .	Ko	2,600
Recoil, meter-kilograms. . .		1,415
Initial velocity V 25. . .	meters	600
	(range. . .	“ 200
Penetrating power at/upon (squared oak timber. . .	m/m	330
(squared fir timber. . .	“	580
	(at target height. . .	meters 1,8
Beaten zone (maximum. . .	“	454
(Accuracy at 300 meters' range (50%)		
(by height. . .	c/m	6,8
(Dispersion at target (by width. . .	“	5,2
radius. . .	“	10,0
	(by deviation in degrees	--
Greatest observed range (meters. . . approx.		--
Normal rate of fire, aimed (single fire. . .		12
shots in 1 minute (repeating fire. . .		20
Mechanical performance, rapid fire in 1 minute,		
shots. . .		40
Time needed to load (with cartridges, count. . .		13
the rifle (seconds. . .		8