

World War II Troop Type PARACHUTES

Axis

Germany, Italy, Japan



An Illustrated Study

Guy Richards



A SCHIFFER MILITARY HISTORY BOOK

World War II

Troop Type

Parachutes

Volume One

Axis: Germany, Italy, Japan

Guy Richards

Schiffer Military History
Atglen, PA

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Introduction

The scope of this work is the troop type parachutes that were used by the Axis forces in World War II. The story of the evolution of the device and technique actually begins during World War I. The campaigns, battles, operations, helmets, uniforms, weapons, regalia, badges and aircraft are fully covered in many other works. Facts pertinent to them have been inserted here if they are obscure or refute what has been previously accepted.

Sadly much information has been lost, perhaps irretrievably, as the war generation passes on. When possible, this writer has endeavored to study and measure the actual equipment and thus correct a lot of misinformation that has for many years been taken for granted.

RES IPSA LOQUITUR

Many people are surprised to learn that parachutes predate powered flight by over a century, perhaps many centuries. The notion of a military application occurred, no doubt, to many people since the Montgolfier brothers, but only as fantasy. Ben Franklin's famous recorded muse* on air landing troops cannot have been the only one. Napoleon Bonaparte contemplated invading England with a corps of balloonists in 1803. Offensive use of airpower was attempted during the siege of Paris when dynamite bombs were dropped from French balloons in the Franco-Prussian War.

Troops delivered from the sky had to await the 20th century, the Great War and powered flight. Observation balloons were the start. The British dropped intelligence agents into neutral Holland from RNAS seaplanes using the balloon-proven 'Guardian Angel' dyed a stealthy black.¹

The Italians inserted reconnaissance troops behind Austrian lines with the same device and a clever bomb bay-like hinged seat controlled by the pilot.²

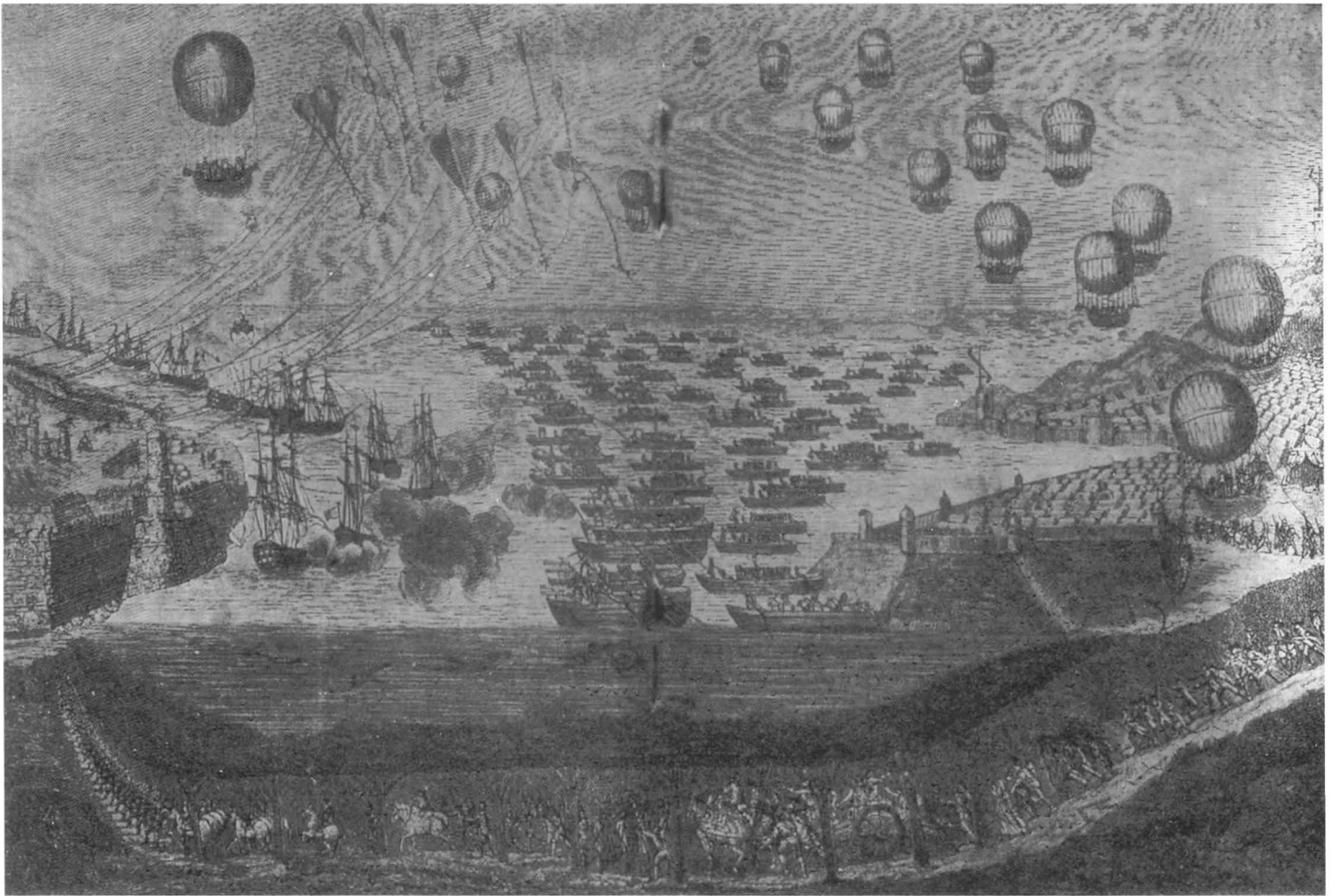
Air power promoter General Billy Mitchell proposed and received permission from General Pershing for dropping the 1st Infantry Division behind the Germans in support of the anticipated Spring offensive campaign of 1919.

...

*"Where is the Prince who can afford so to cover his country with troops for the defense...as that ten thousand men descending from the clouds, might not, in many places, do an infinite amount of mischief before a force could be brought together to repel them?" – Benjamin Franklin, 1784

¹ Greenwood, Jim "Parachuting for Sport" General Pub Co. NY 1962 p.27

² see "Airborne Warfare 1918 -45" Barry Gregory & John Batchelor Phoebus London 1979 p.17



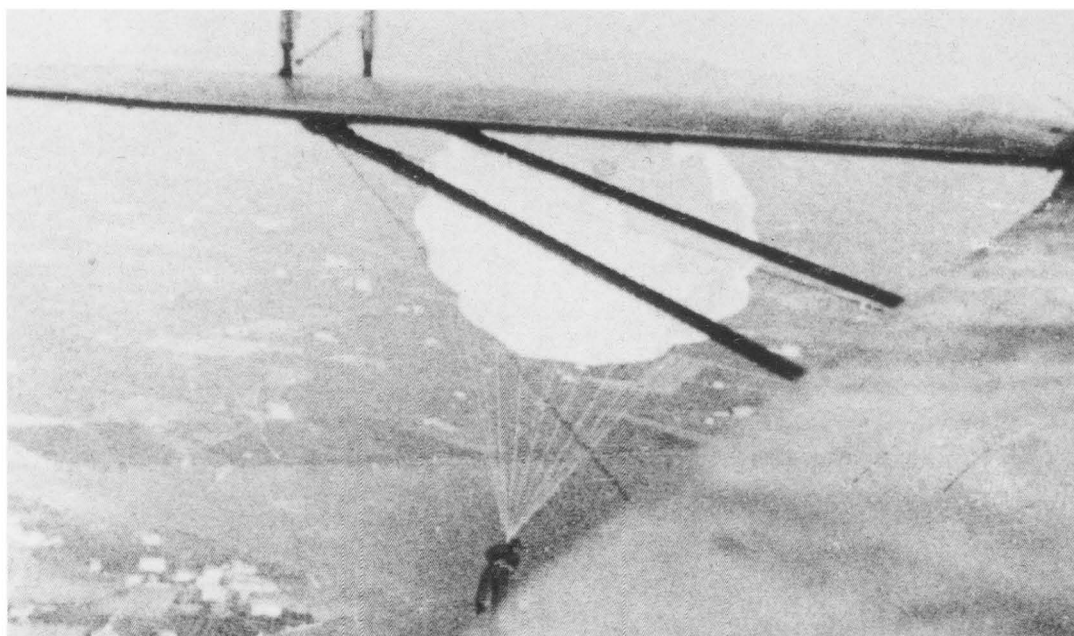
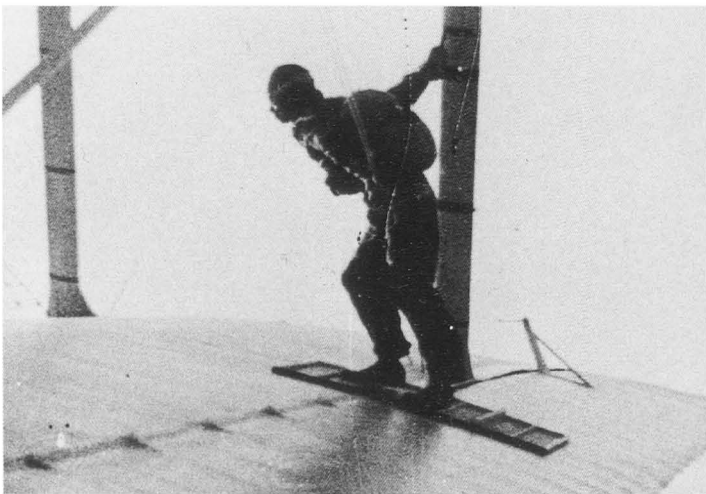
In 1803, Napoleon Bonaparte contemplated invading England by “triphibus” means: conventional barges, the novel hot air balloons and the prescient tunnel. Fortunately, the scheme was then unworkable and he went elsewhere.

Evolution

The process by which parachutes were adapted from pilot escape to soldier transport was fraught with tragedy. Every experimenting nation learned that manually activated systems relied too heavily on the jumpers performance and that static line operation was the solution. They learned that troop parachutes had to be purpose designed. They learned that para-troops had to be cargo carriers. They learned that reserve parachutes are necessary. The price for this knowledge was the lives of a number of brave men . . . demonstrating the adage that 'all of our lessons are written in blood.'



Italian parachute pioneer, very likely P. Freri, c.1922.



Pull off technique, 1920s.



Pull off jump apparently initiated by static line.



Salvator as an aircrew escape seat type.

Italy

The Italians were the pioneers in the concept of dropping troops by parachute. In 1917, the Italians were inserting scouts behind enemy lines via the British 'Guardian Angel' system. By 1922, experiments with native designs were being made. General Douhet, the airpower theorist, has been credited by some with an experiment to test the feasibility of paratroops, but Italian sources emphasize the guiding role of Prospero Freri who was an enthusiastic parachutist³. The first mass drop of Italian troops was made at Cinisello near Milan on 6 November 1927 from CA 73 transports.⁴

The original paratrooper rig was the "Salvator" D30 with a seven meter canopy. The D30 harness was a wide belly band with one shoulder strap. Later a single opposing leg strap was added. It was an aircrew escape type with a dual activation that is: static line (five meters long) and manual. The 23' canopy (forty-six square meters) proved to be much too small. The Type 30 was also produced as a chest (*ventrale*) and seat (*seggolino*).

The designation "D" means back type (*Dorsale*). The Type 30 underwent so many changes that now it is probably not possible to completely describe the evolution. The D 30 had a canopy of sixteen gores of four panels each. The manual release system used a cord cutting cable.

The D 30 was packed with the skirt at the suspension line attachment points secured by retainer bands around a small wooden hoop. This ensured positively an open wind channel. The lines were stowed vertically under bungee bands on the bottom of the pack tray. The lines converged in a single loop that was attached to two large harness loops.⁵

A special tool compressed the pilot chute spring and like a winding key drew the four sides of the container together which would be secured by 200 kg test cord. The wooden hoop was retained at the skirt for future use if the D 30 was activated. The D 30 weighed 6kg and was a clever, original design that sought to combine the virtues of simplicity, dual operation, and freedom of motion for an aviator in a compact package. The lack of a saddle seat, leg and shoulder straps give it a disquieting aspect to modern eyes.

The matter of Paratroops was ignored until 1936 when the question was raised again. Military-political in-fighting resulted in the Air Force being awarded preponency for the training and equipment.⁶ The Army, the Navy, the Air Force and the national police (*Carabinieri*) all got into the paratroop business.

Air Marshal Italo Balbo, long an advocate of paratroops, used his office as governor of Libya to raise the first unit in 1937. Their first school was established at Castel Benito airport near Tripoli and volunteers were recruited from native troops. A light battalion of 300 men began training 22 March 1938.

The D 37 parachute was adopted with a larger canopy of forty-nine square meters of silk (about 7.68m or 25'2" diameter) sixteen suspension lines and a stated descent rate of 7m/s. Weighing 8kg. It was both static line and manual operated but still had only one (right) leg and one (left) shoulder strap. The ripcord grip was positioned on the belly band and the static line was stowed out of sight under the pack tray. The exit technique changed from a dive to an upright jump with one hand on the manual activation handle located on the belly band.⁷

³ "I Paracadutisti 1917 - 96" Nino Arena p.28

⁴ Tugwell "Airborne to Battle" p.24

⁵ D30 manual p.35

⁶ Lundari p.88

⁷ Arena (1996) p.56

In 1938, the Italians formed a battalion of Libyan paratroops and they were trained on the D 37. Two months into training produced a hundred casualties including twenty dead and jump operations ceased.⁸

The Salvator was redesigned into the D 39 with two each leg and shoulder straps, weighing 12kg, a canopy of 54sq.m. (8.3m diameter) and descent of 6m/s. Still both static line and manual, the canopy was now about 27' diameter, but problems remained. Experience clearly taught that the jumper must be fully encased by harness straps over the shoulders and around the legs. The D 39 harness shoulder straps converged in front into the locking hardware. The D 39 served on as pilot escape equipment until the 1960s.

The D 40 was issued, which appears similar to a D 39 with the harness buckles of the later IF 41, one at each leg strap and two across the chest and weighing 9kg. This model had a high left inboard rectangular ripcord.⁹ This was the rig used by the Folgore Paras in their combat drop in the Greek islands. It had a short service life. Reportedly the D 40 could be jumped at seventy meters AGL.

Finally the IF 41/SP was adopted. Nomenclature means Infantry harness model 1941-parachute school (*Imbracatura da Fanteria mod. 1941 Scuola Paracadutisti*). This one had a 8.45m diameter canopy (27'8") for an area of 59sq.m., weighed 9.95kg and descended at 5m/s. The IF 41 was bag deployed with a five meter static line. This was a purpose designed parachute for paratroops and remained in service albeit modified until 1954.

The IF 41 canopy was made of synthetic silk (rayon). The IF 41 was the parachute used in combat drops by the X *Reg't Arditi* and the ADRA and was extremely reliable.¹⁰ The IF 41 looks so much like a German RZ 16 that one cannot help wondering if there was some influence in the design. The IF 41 canopy could be white, camouflage, or black for night drops. There was no provision for a reserve.

The Salvatore systems D 30, 37 and 39 are identified by the tight rounded containers with four pack opening bands and a central circular cap which is the top of a pilot chute. This pilot parachute is ejected by action of a coil spring mounted on top. The D 30 and D 37 appear almost identical, except the D 37 has a right leg strap. The D 39 has two shoulder straps and two leg straps. The shoulder straps tend to converge to the center of the wearers' chest depending on harness adjustment. There is a small, handy pocket on the belly band right side for holding the static line snap hook.

The D 40 closely resembles the 39, but has two square buckles across the chest straps. The chest strap webs are arranged to give a beveled edge appearance. A rectangular ripcord grip in a cloth pocket is prominent on the left side. There are no buckle releases on the upper harness webs, but risers appear to run over the shoulder to the bottom of the pack tray. Suspension was therefore shifted to the shoulders.

The IF 41 container appears much like the German RZ 16, i.e., a square container, no POBs and the static line is stowed horizontally on top. The IF 41 harness has six metal buckles: one on each leg strap, two on the left side of the belly band and one on each shoulder strap. These each secure a flat adapter.

All, except the D 40, suspend the jumper from a point on the back without risers, that is the suspension lines radiate from the belly band up to the canopy. A jumper most certainly could not slip the canopy.

Photos show Paras jumping from both sides of the SM 82.¹¹ Well suited to air drop operations, the Germans pressed the '*Marsupiale*' into service in at least one school.

Landing must have been the same grim forward crash, unless lucky winds were pushing the jumper backwards. None of the canopies appear to have been dyed, until the IF 41 was adopted.

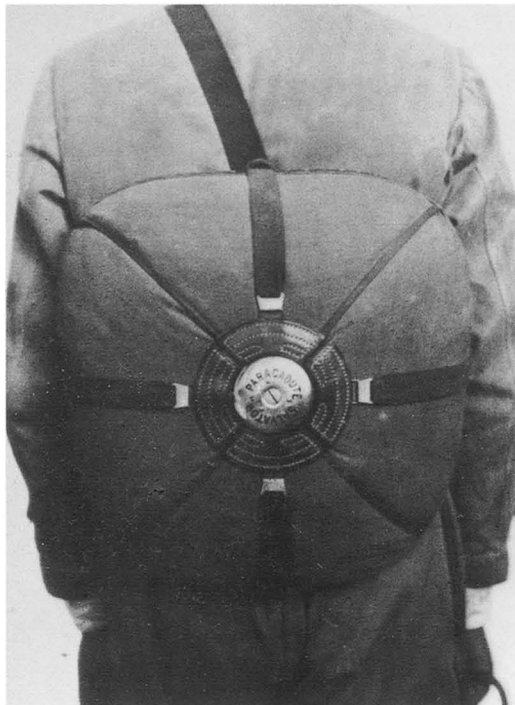
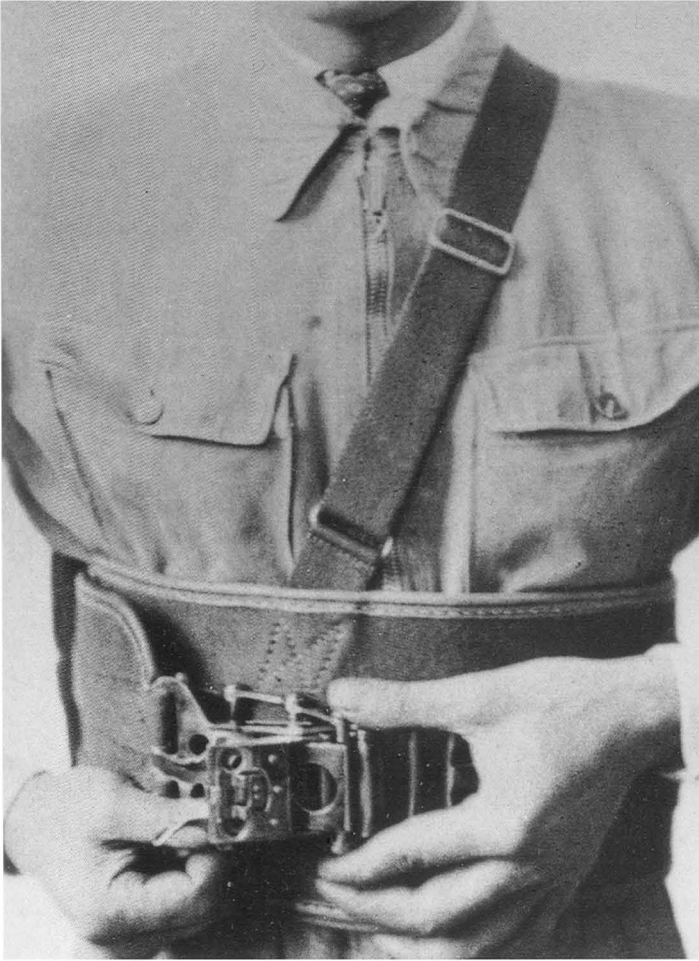
⁸ Lundari p.88

⁹ Arena (1972) p.69

¹⁰ Lundari p.89

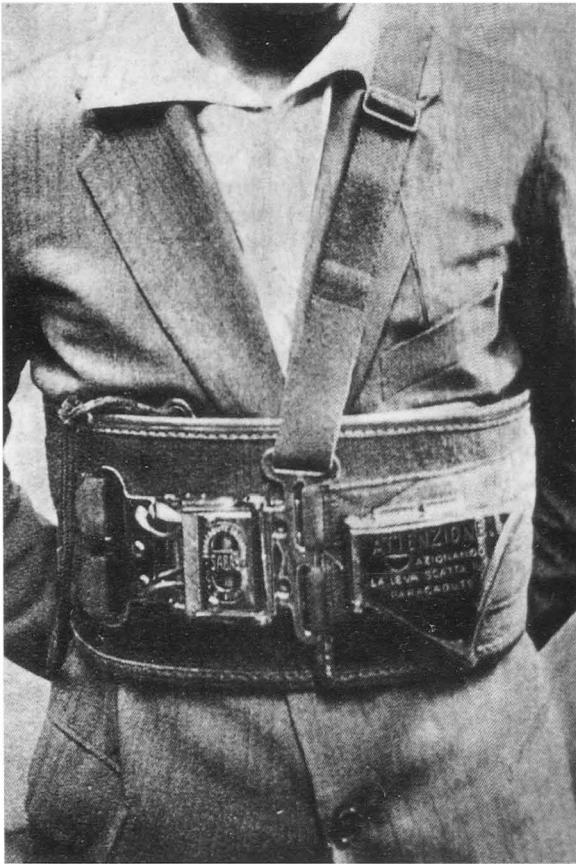
¹¹ Arena (1996) p.103

Salvator D 30

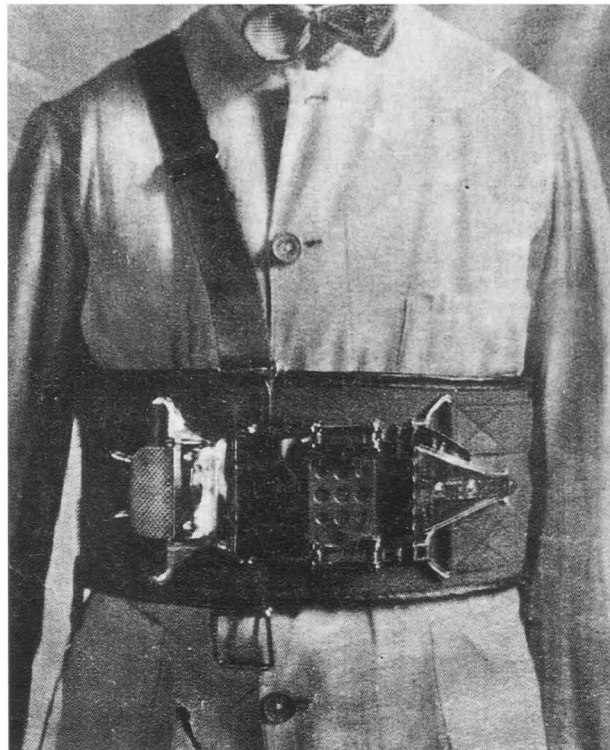


D 30 front, side and back views.

Salvator D 30

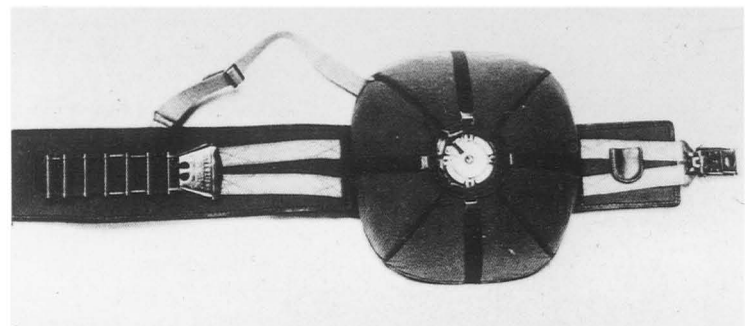
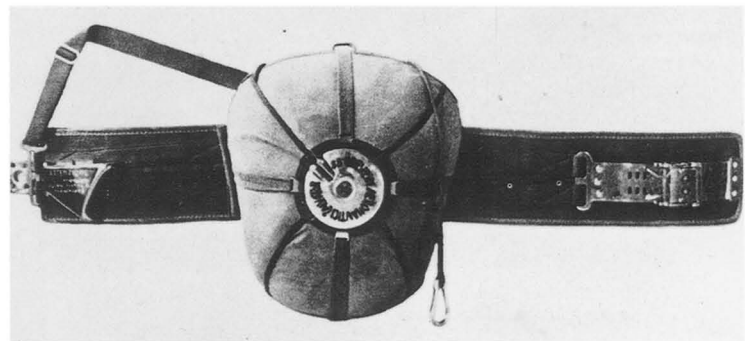
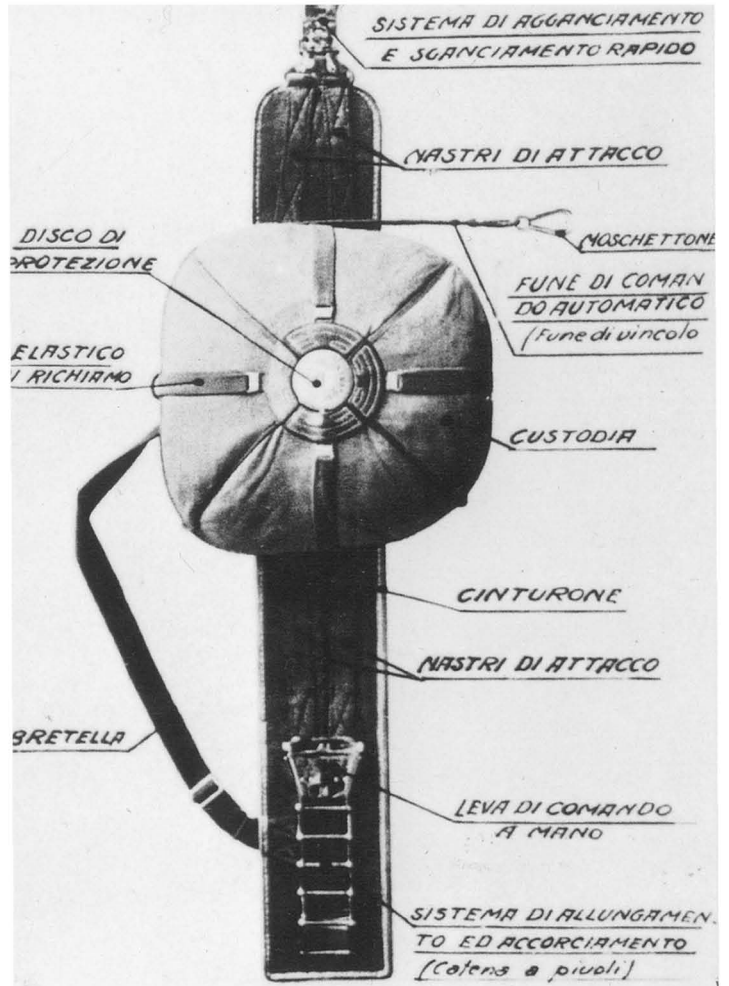


Waist belt variations



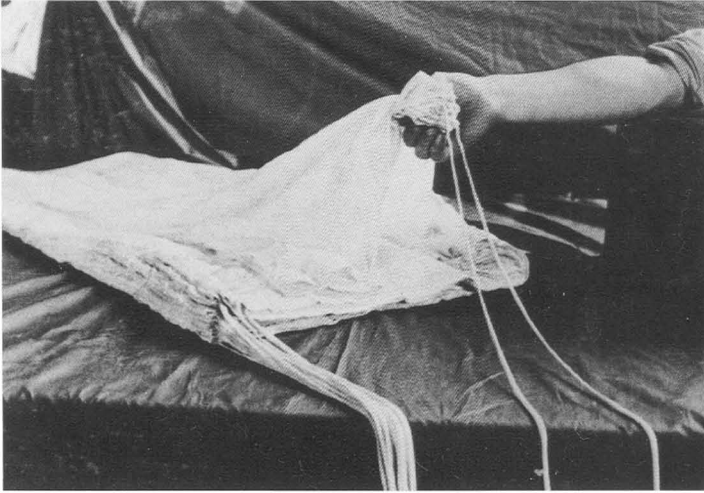
Salvator D 30

- WIDE WAIST BAND.
- ONE SHOULDER STRAP
- SMALL ROUND CONTAINER.
- FOUR PACK OPENING BANDS.
- STATIC LINE and MANUAL ACTIVATION.

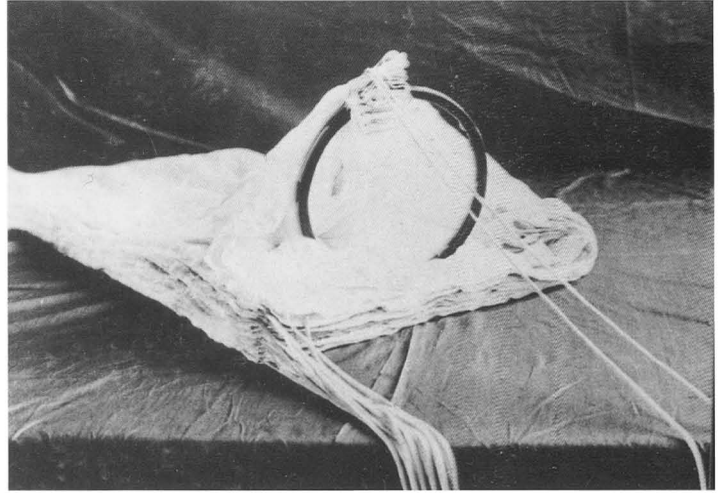


Variations of the D 30 system. The small pocket on the right side of the waist belt holds the static line snap hook.

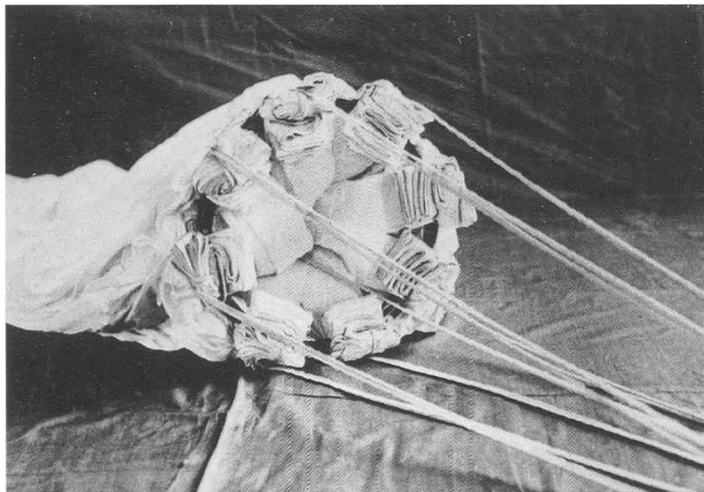
Salvator D 30 packing sequence



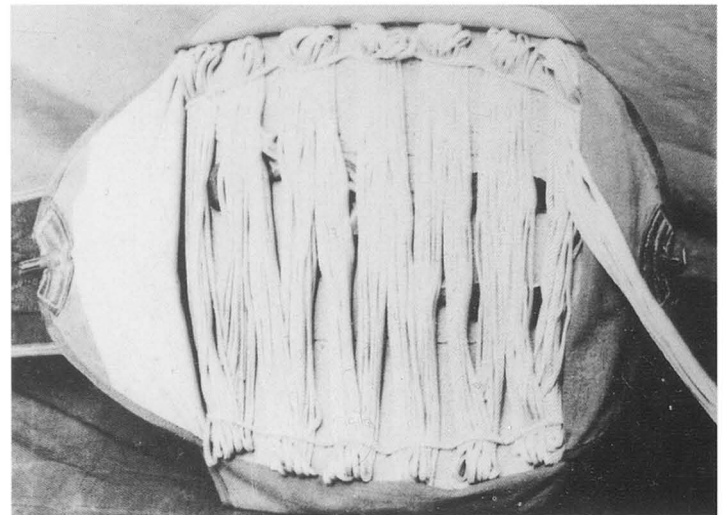
The canopy is pleated.



Suspension lines secured to hoop under elastics.



All sixteen lines are joined to hoop forming a neat wind channel.

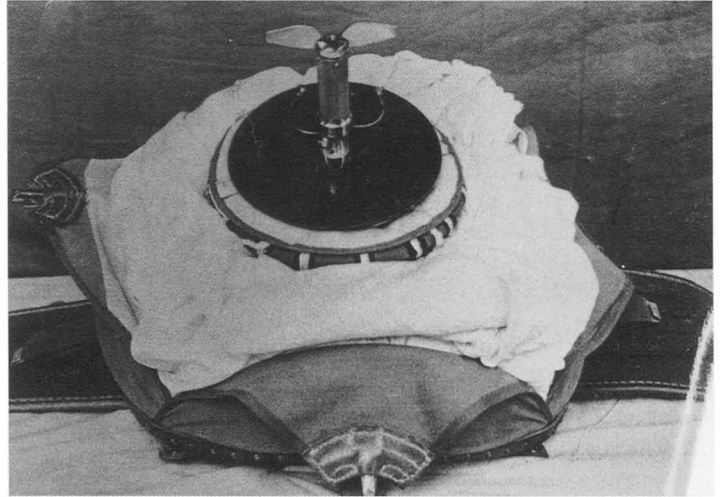


Suspension lines stowed under bungee cords on pack tray. The lines terminate in a loop that is connected to two large loops on the back of the pack tray.

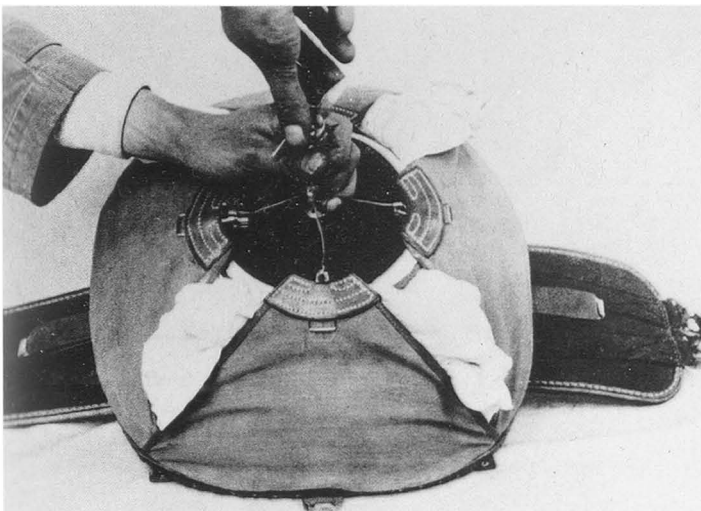
Salvator D 30 packing sequence



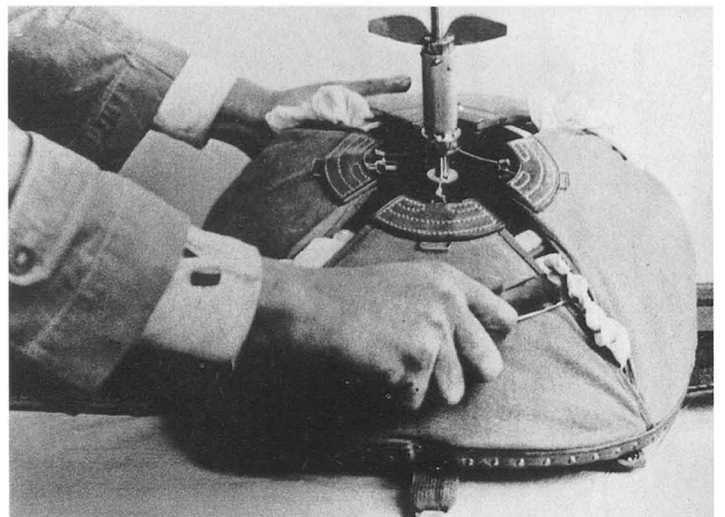
The winding key is applied to the pilot parachute.



The pilot chute is pressed down and the coil spring on top is compressed, centered on the apex.

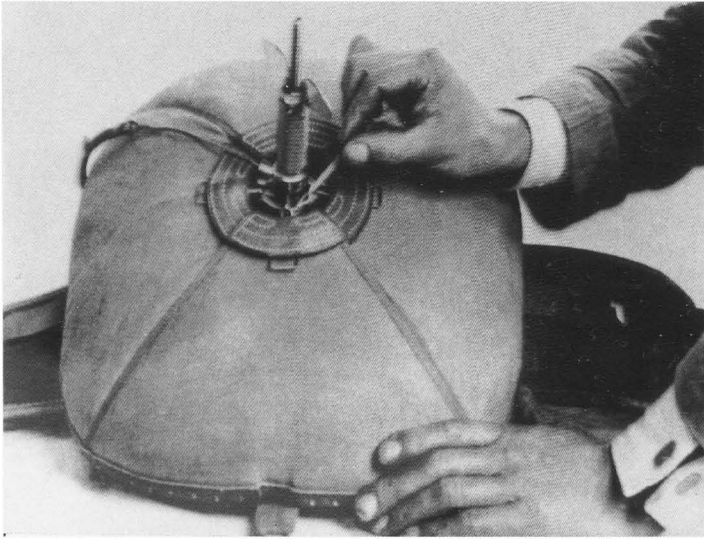


The key is wound to draw the container flaps in.

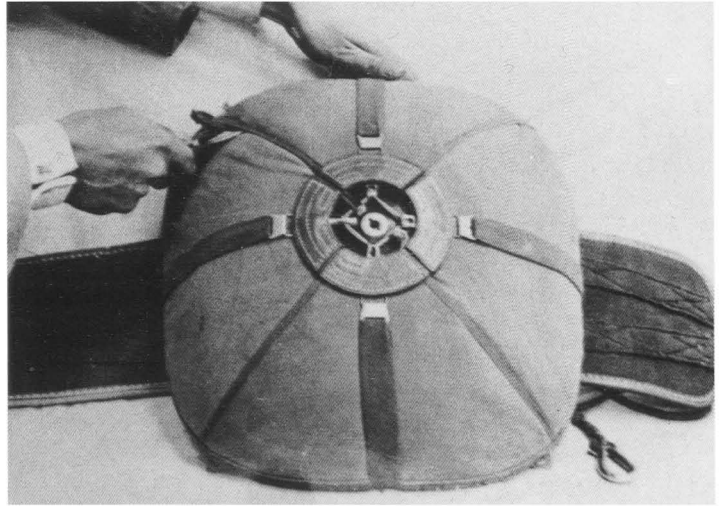


All exposed silk is pushed back under the flaps.

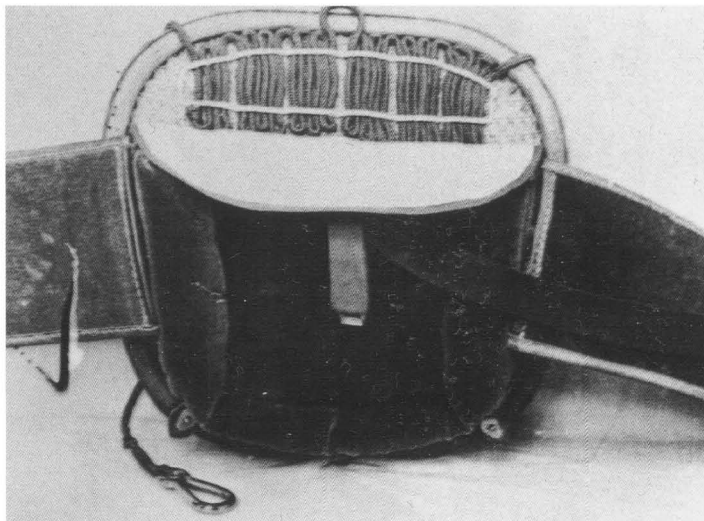
Salvator D 30 packing sequence



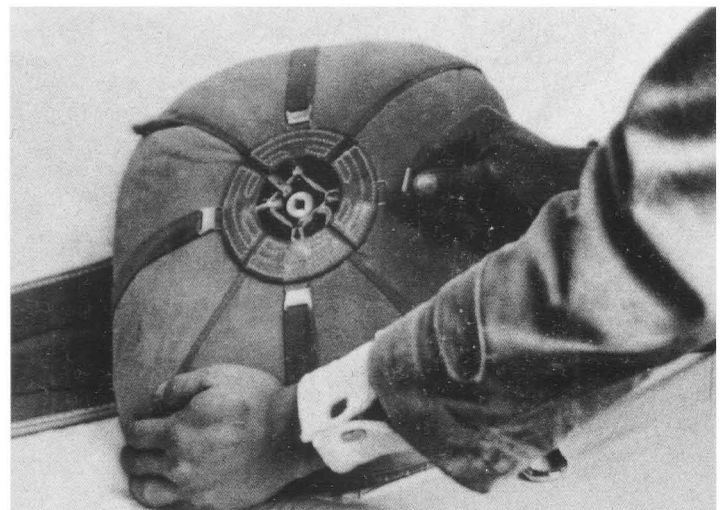
The container closing cord is tied through the cord cutter blade slot.



The pack is dressed with the paddle, the cord cutter blade slot. Here the cutting cable is adjusted.

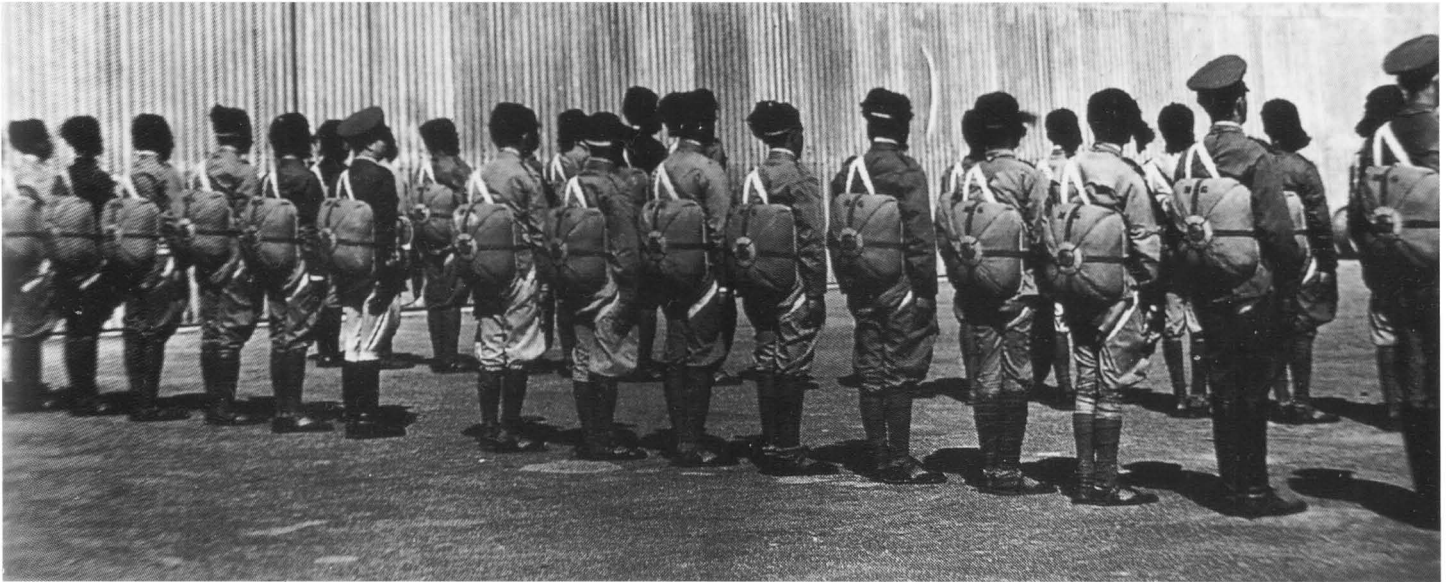


The static line is stowed on wearer's side just above a comfort pad.



The pack opening bands are secured to the pack tray. A metal disk will cover the hole.

Salvator D 37



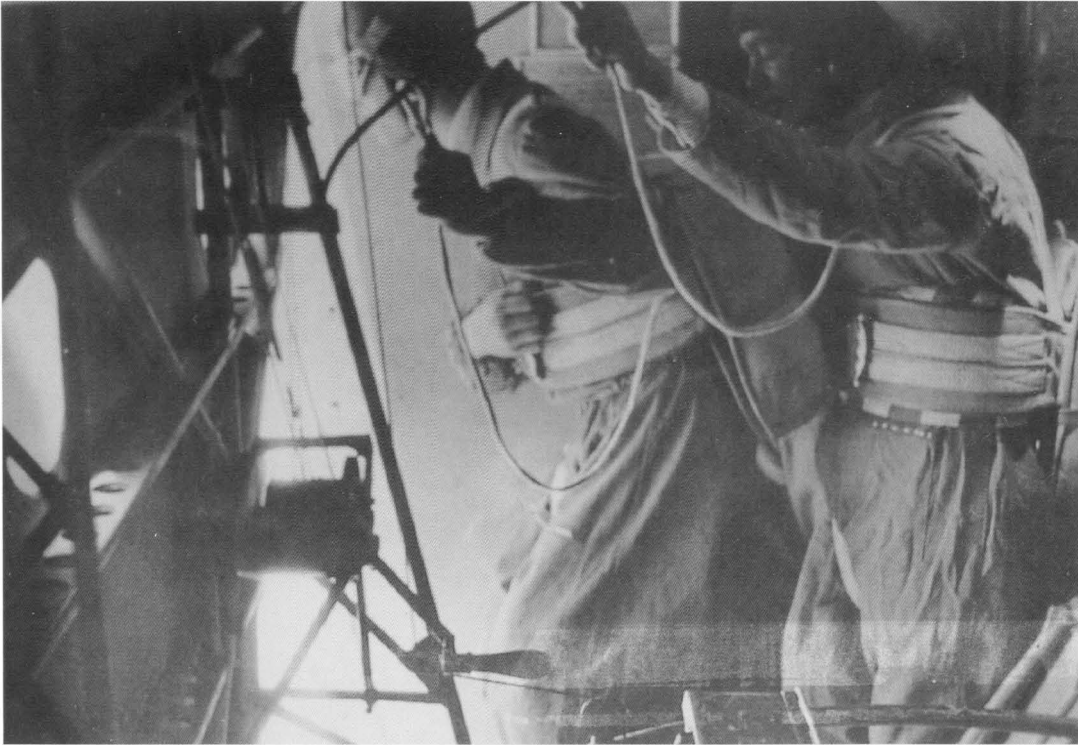
Libyan troops with D 37 system

- WIDE WAIST BAND
- LEFT SHOULDER STRAP
- RIGHT LEG STRAP
- CONTAINER LIKE D 30
- STATIC LINE and MANUAL ACTIVATION



Libyan trooper exits with a D 37. The small pocket on the belly band stows the static line snap hook.



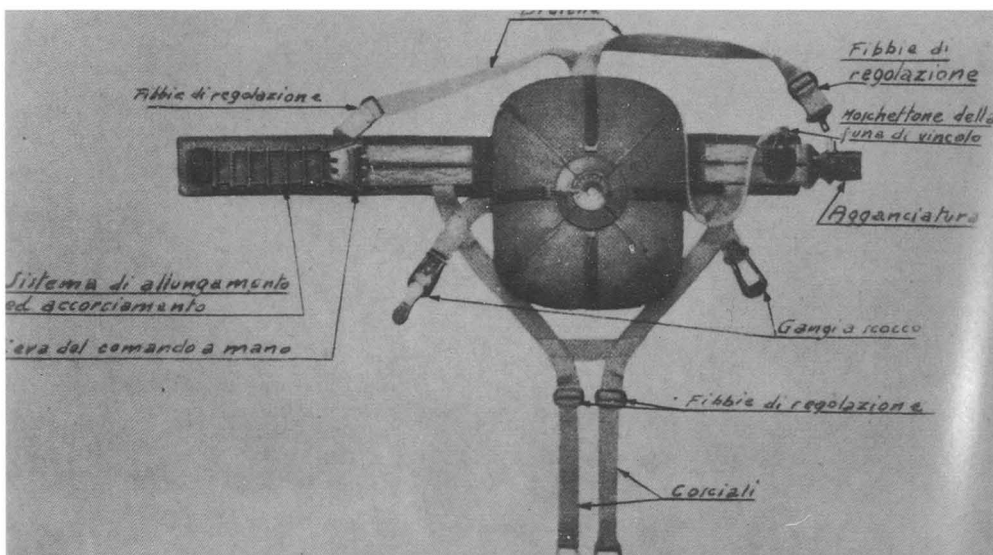


Preparing to exit, the first jumper grips the manual activation lever while holding the static line.

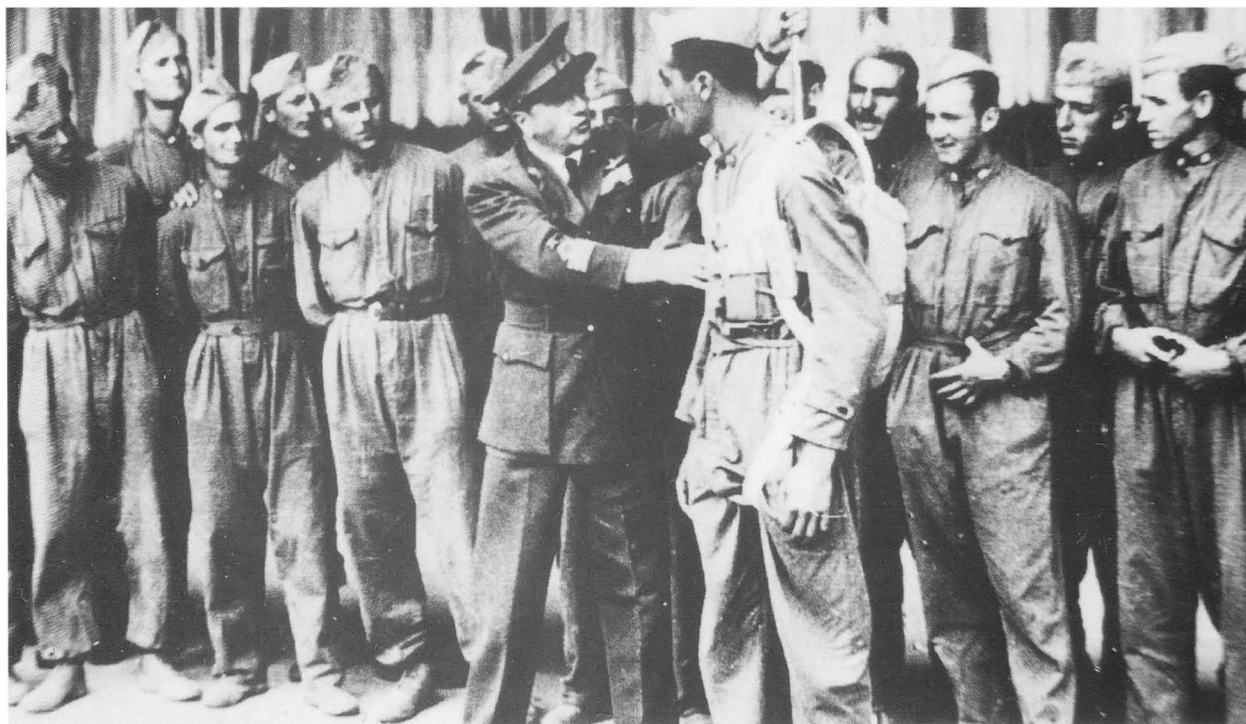




- WIDE WAIST BAND
- TWO SHOULDER STRAPS
- TWO LEG STRAPS
- CONTAINER LIKE D 30
- STATIC LINE and MANUAL ACTIVATION







- HARNESS with TWO CENTRAL RELEASES
- TWO LEG STRAPS
- RIPCORDER HANDLE on LEFT SIDE
- RISERS RUNNING over the SHOULDERS to PACK TRAY
- CONTAINER LIKE D 30
- STATIC LINE



Salvator D 40



The D 40 harness seems to have omitted the characteristic belt and the jumper is suspended by risers from the shoulders in the Smith/Irvin design manner. The D 40 is quickly identified by the chest strap buckles and the 'beveled edge' fabric just over them.



The D 40's risers are more clearly visible here.

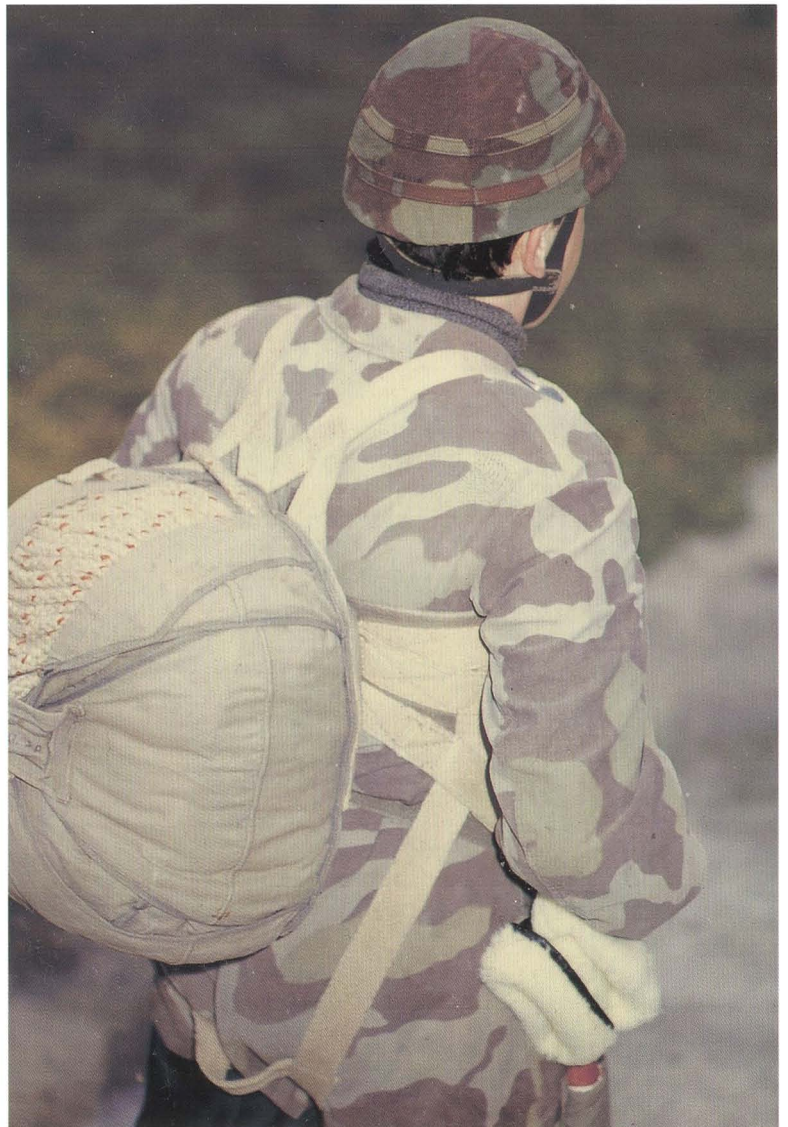
IF 41 SP



- SIX SQUARE BUCKLES
- STATIC LINE STOWED HORIZONTALLY ON TOP
- BOX LIKE CONTAINER
- NO PACK OPENING BANDS
- NO RIPCORD



IF 41 SP



The IF 41 SP somewhat resembles the German RZ 16.



MINISTERO DELLA GUERRA

DIREZIONE SUPERIORE DEL SERVIZIO TECNICO DEL GENIO

MEMORIA SUL PARACADUTE “IF. 41 SP.,”

STABILIMENTO TIPOGRAFICO CARLO COLOMBO
ROMA MCMXLII-XX





Front view



Rear view



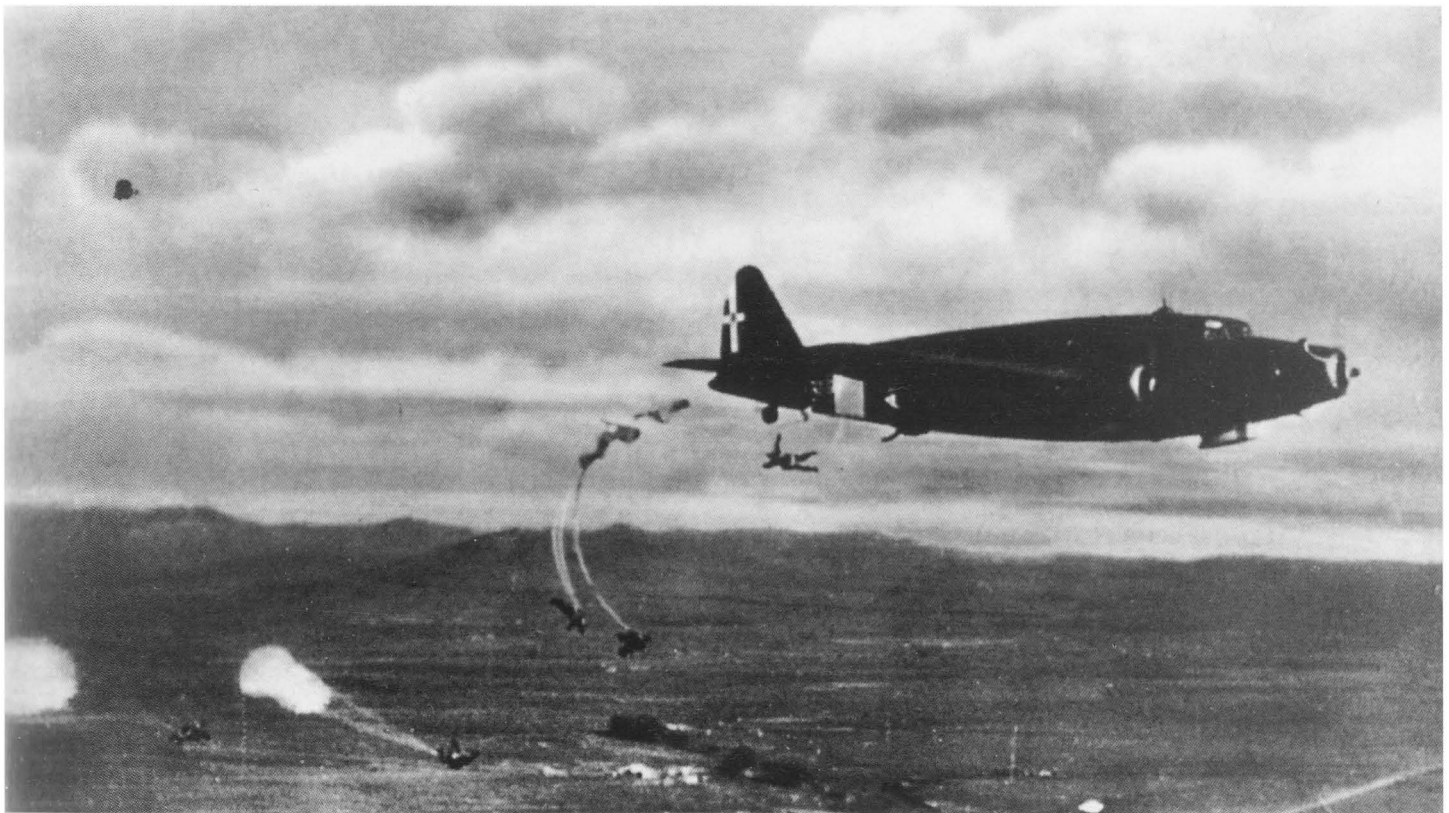
Demonstration of the closure of the chest straps by means of the quick ejection/locking system.

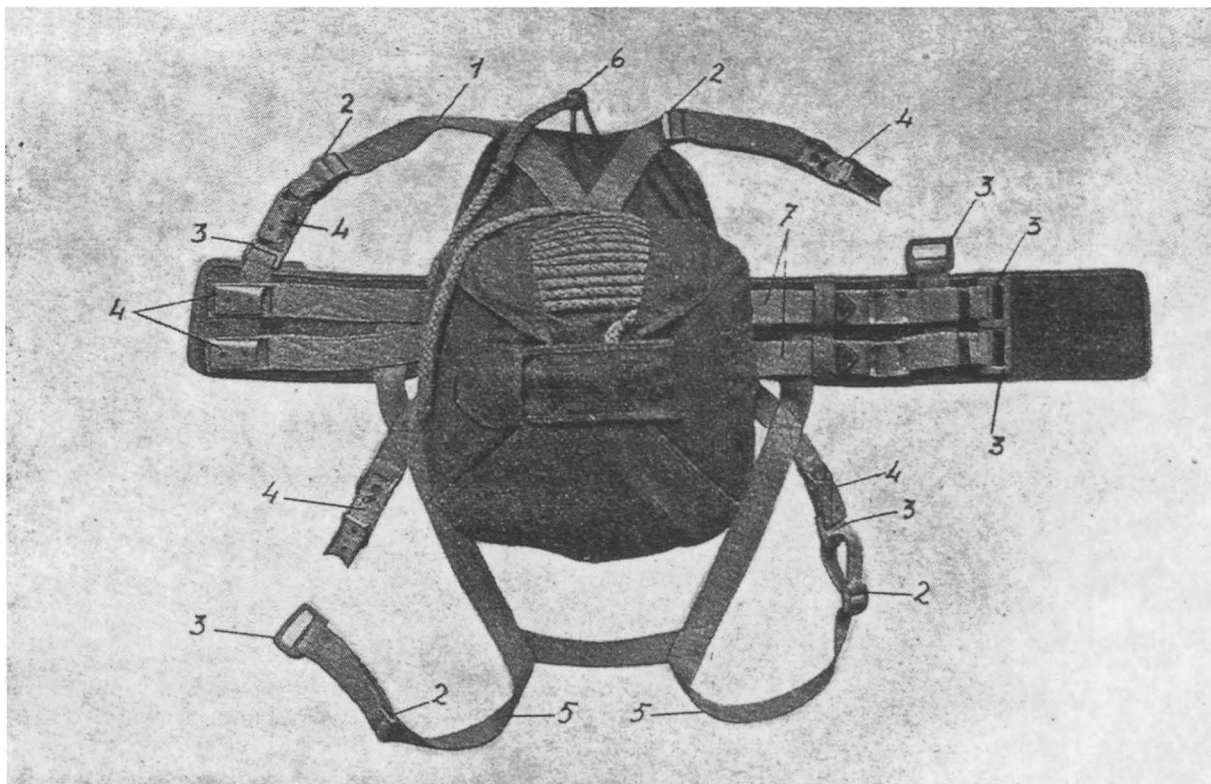


Demonstration of the closure of the shoulder and thigh straps. The parachutist adjusts the shoulder and thigh straps to assure that they are snug. The adjustment eliminates the possibility of the parachute being too tight or too loose.

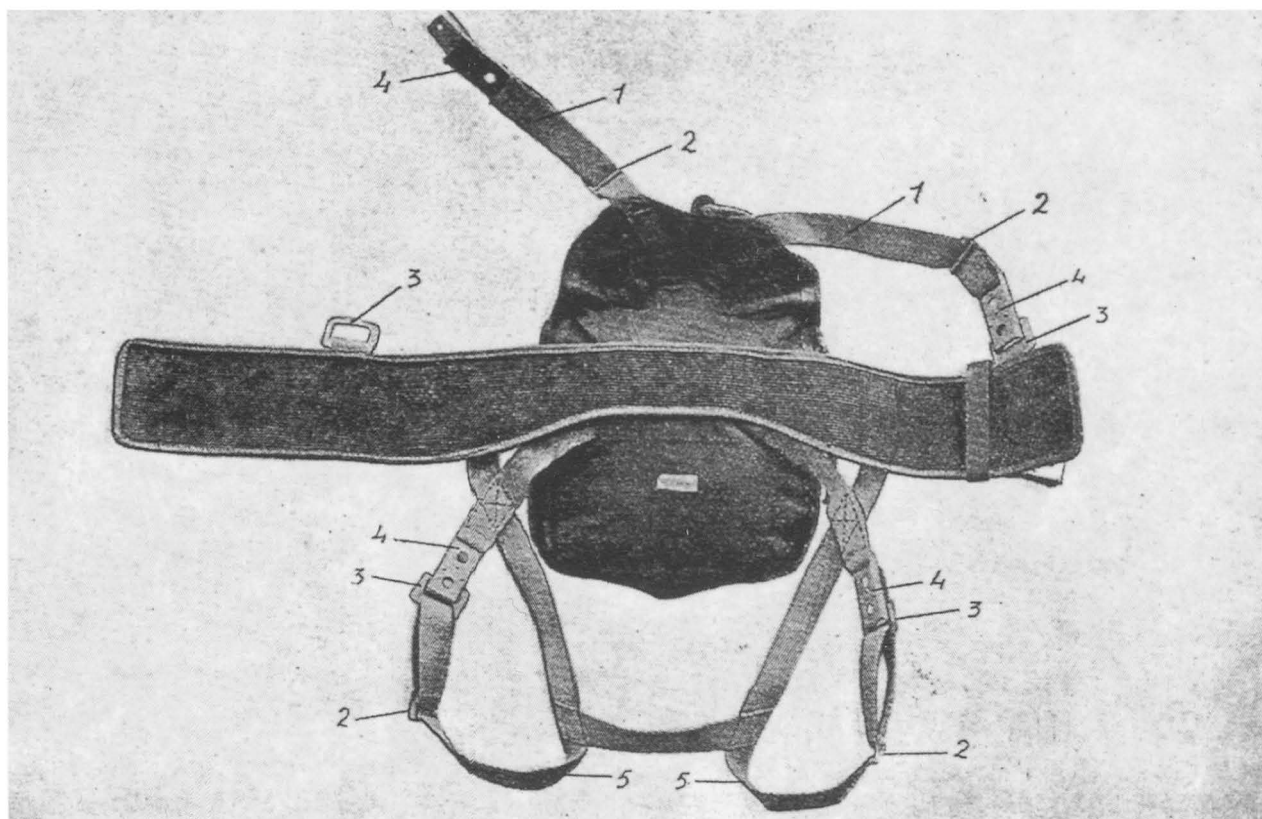


The IF 41 SP being jumped. The suspension lines being pulled from the bag are bowed in the slipstream as is the static line.

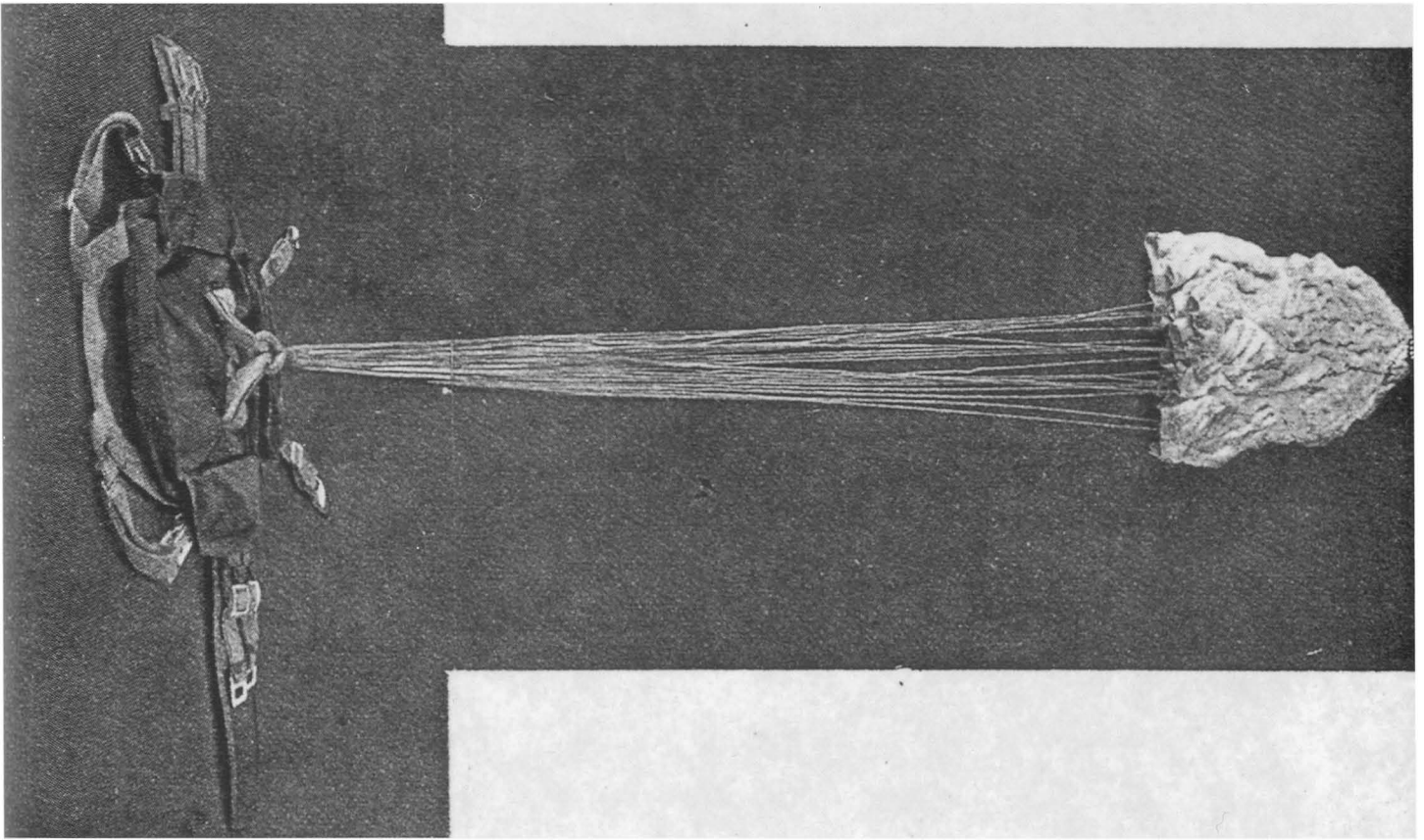




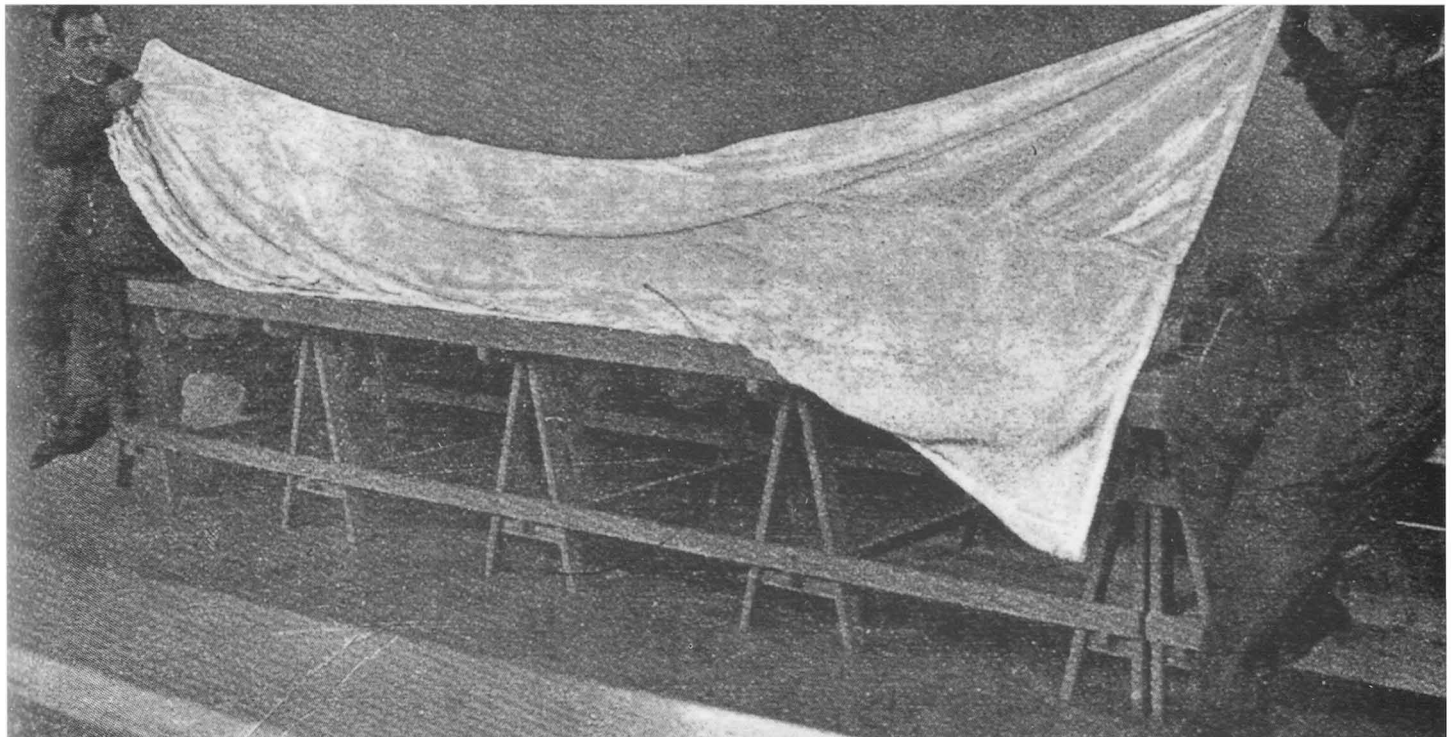
Parachute seen from the rear. 1.) shoulder straps. 2.) thigh strap adjustment. 3.) hooking ring. 4.) fast ejection/locking system. 5.) thigh straps. 6.) safety hook attached to the rope deploy system. 7.) chest straps.



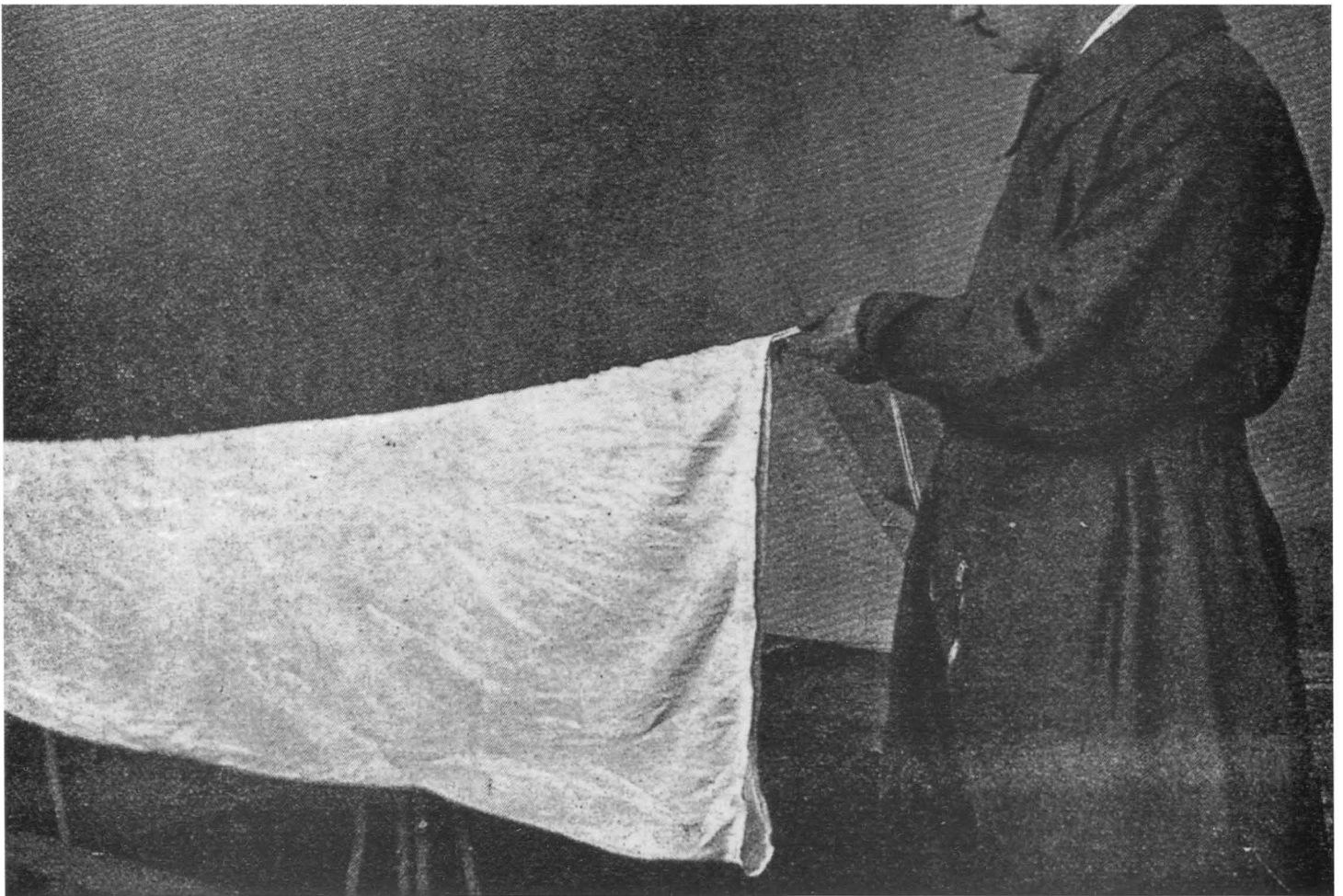
Parachute seen from the front. 1.) shoulder straps. 2.) thigh strap adjustment. 3.) hooking ring. 4.) fast ejection/locking system. 5.) thigh straps.



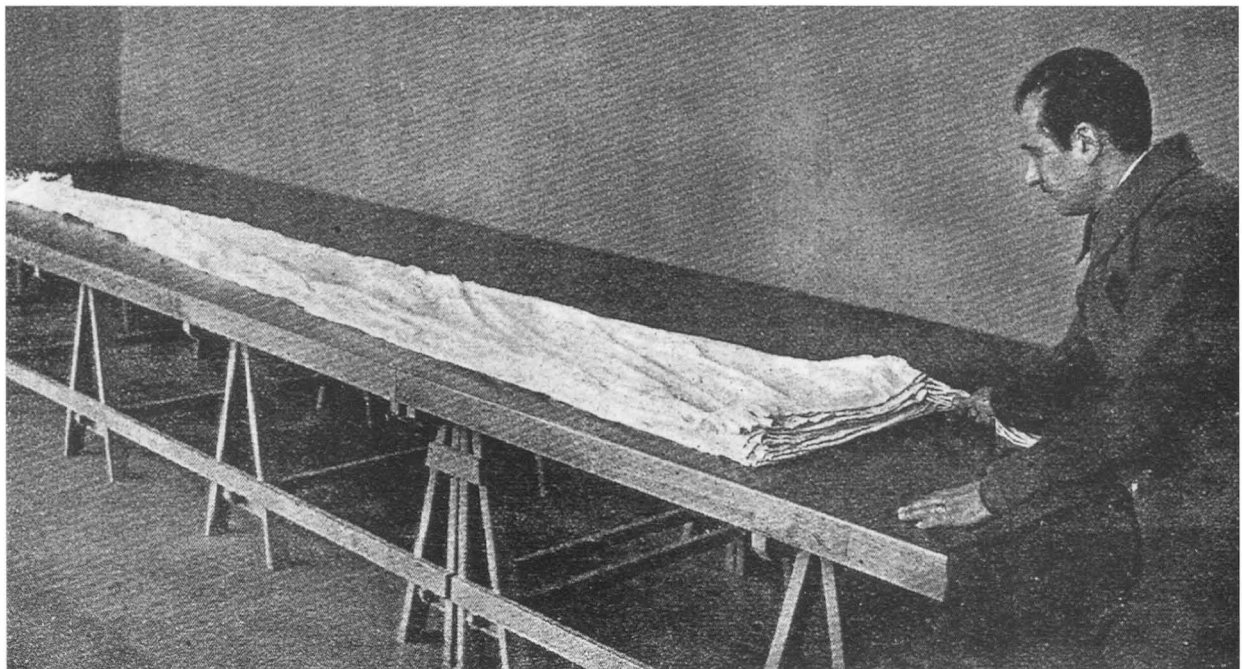
1.) Place the parachute preferably on a waxed table as shown in the photo.



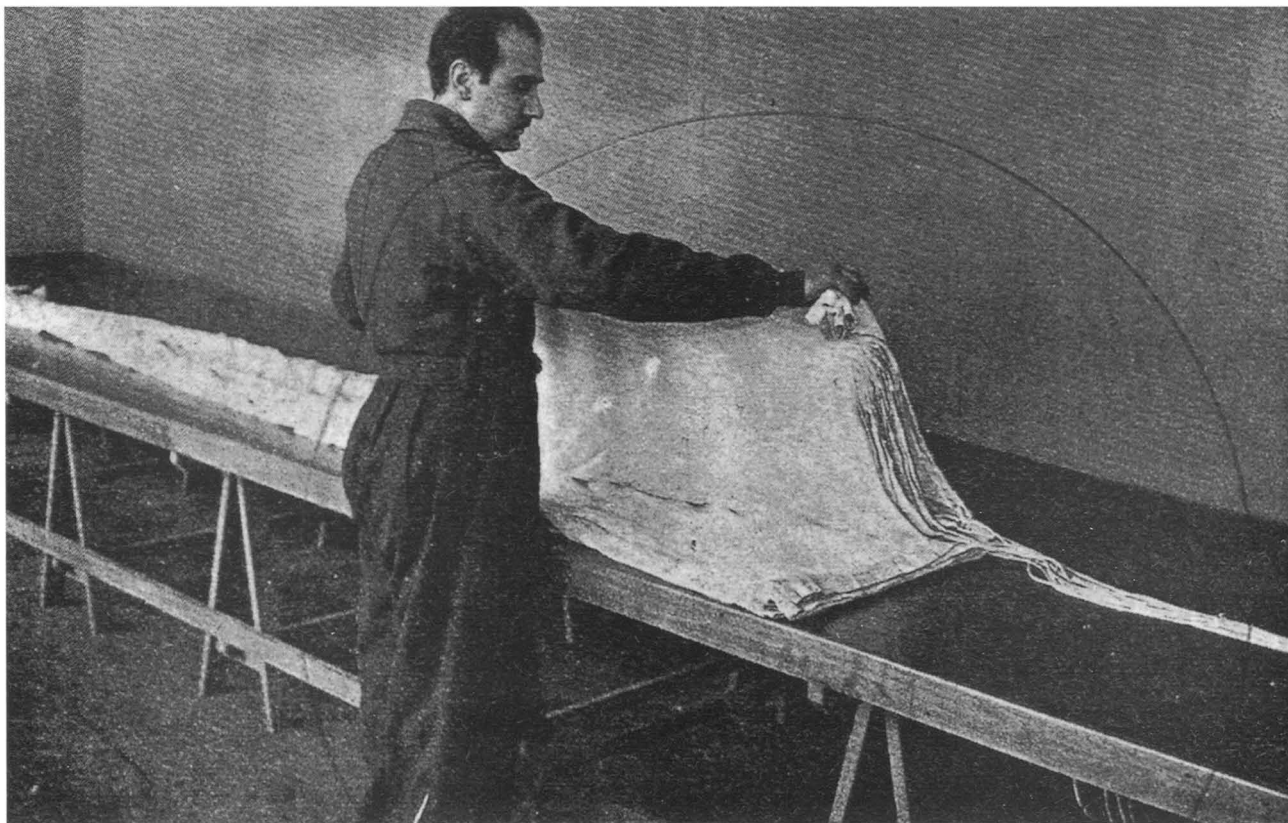
2.) Folding simultaneously from both ends starting from the cord marked number 10.



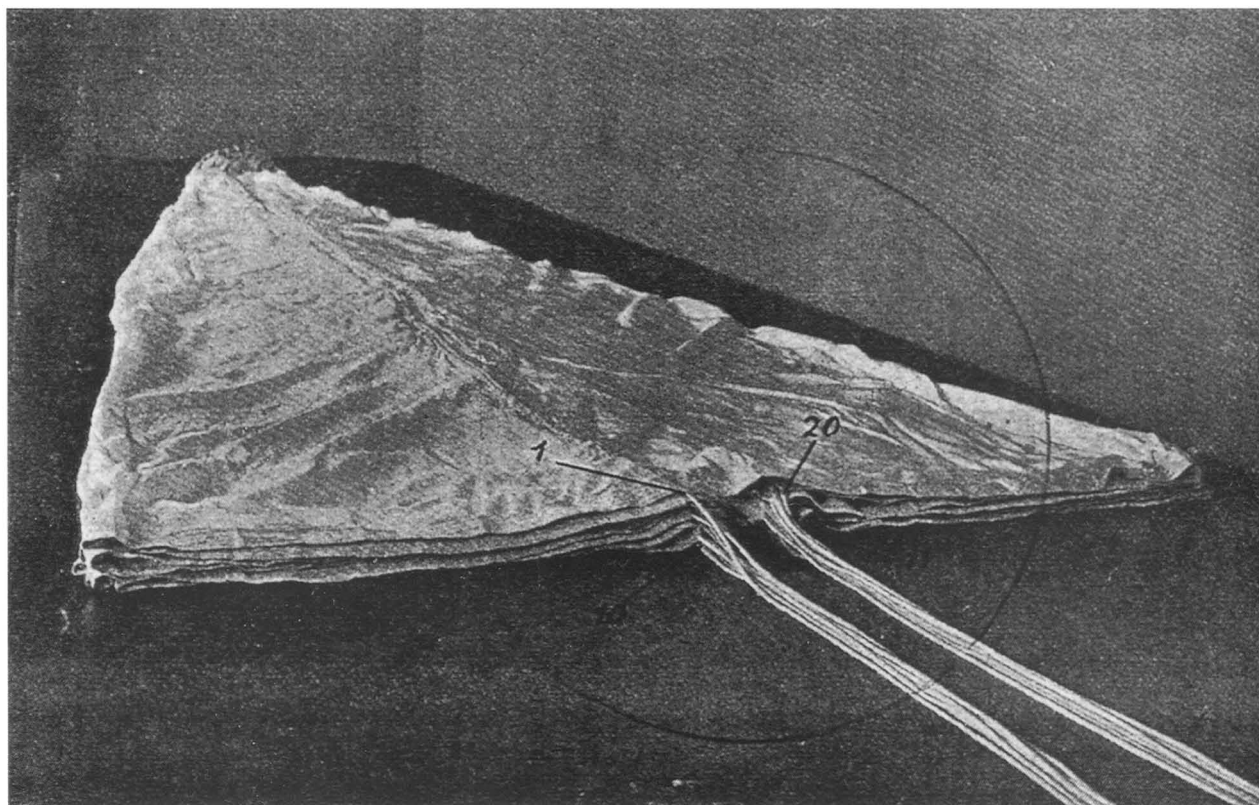
3.) Join the following nineteen sections in numerical order, meaning, the 9th under the 10th etc., thus joining all the sections to one side and all the ropes on the other.



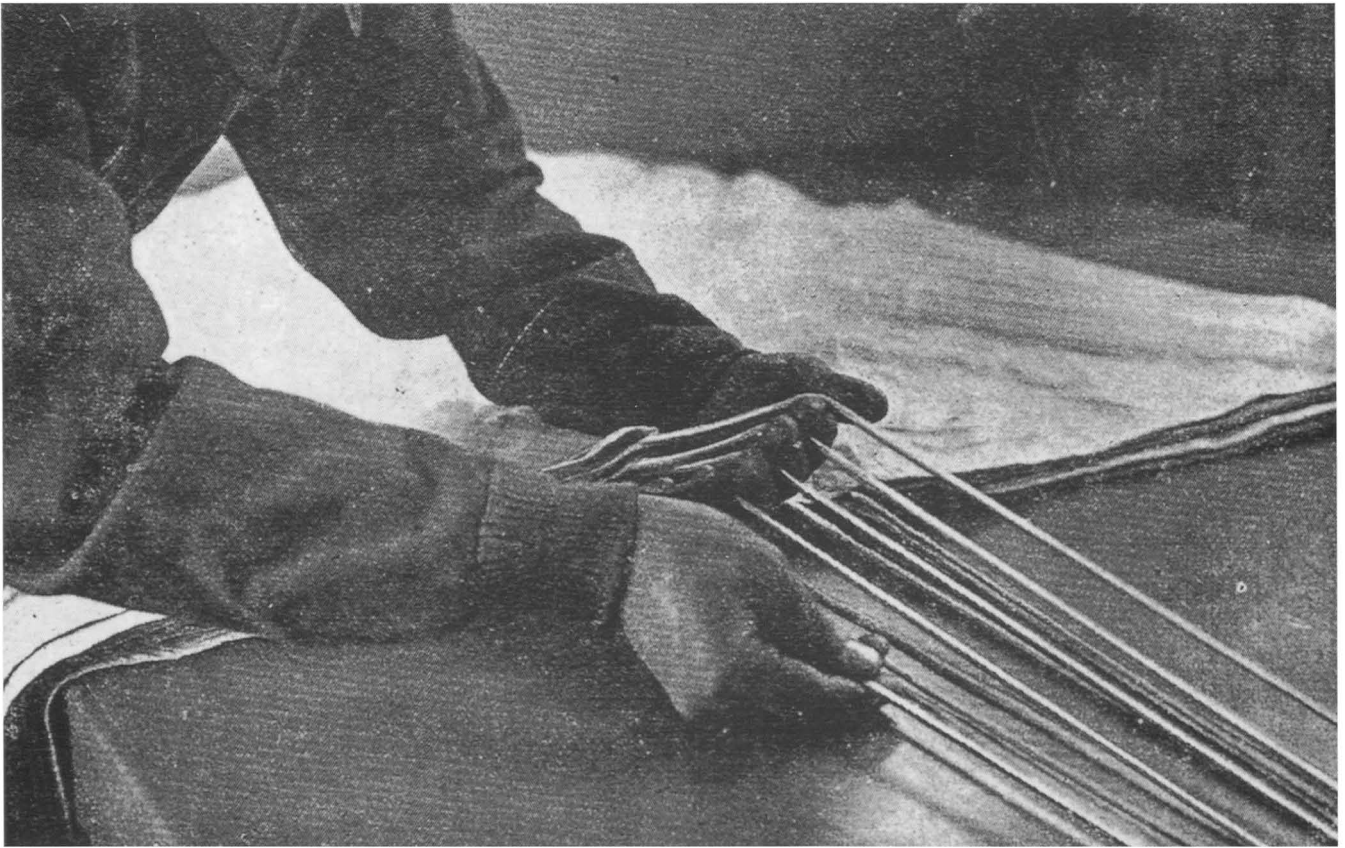
4.) The silk chute has to be folded as in the photo.



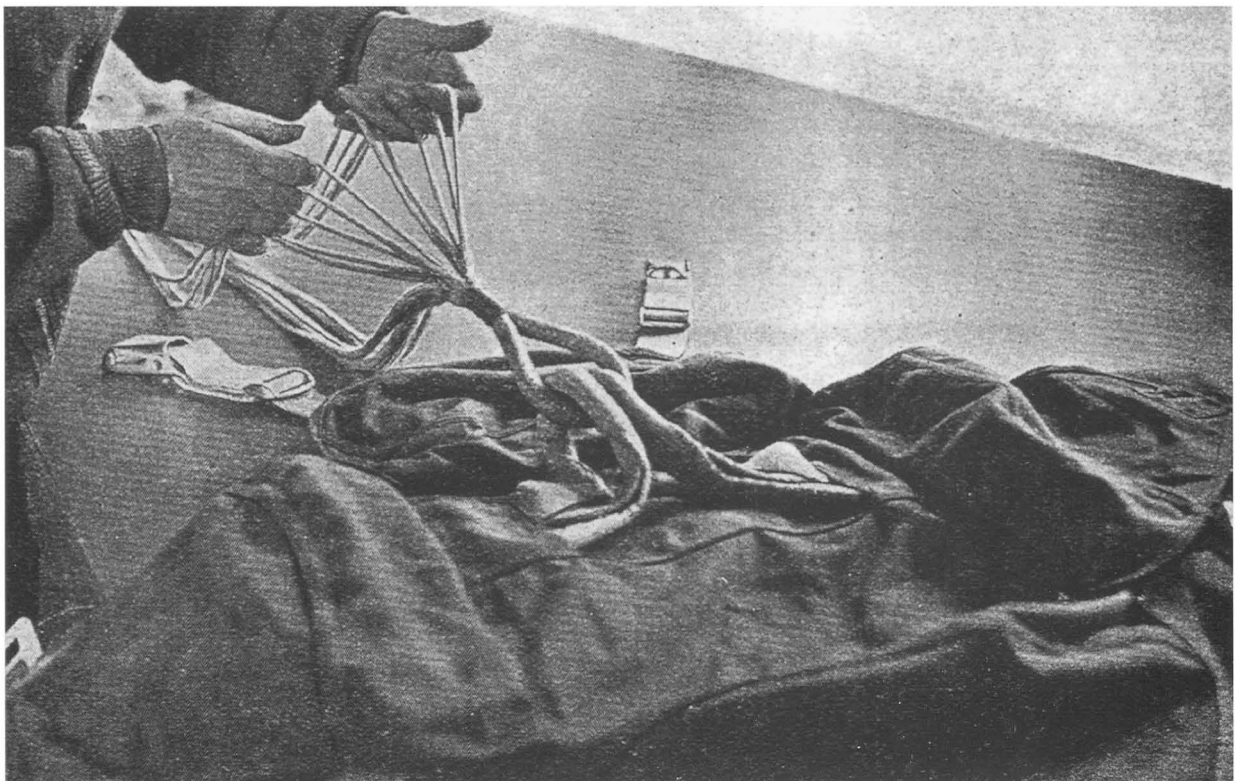
5.) Divide the chute sections in half, 10 sections on the left and 10 on the right.



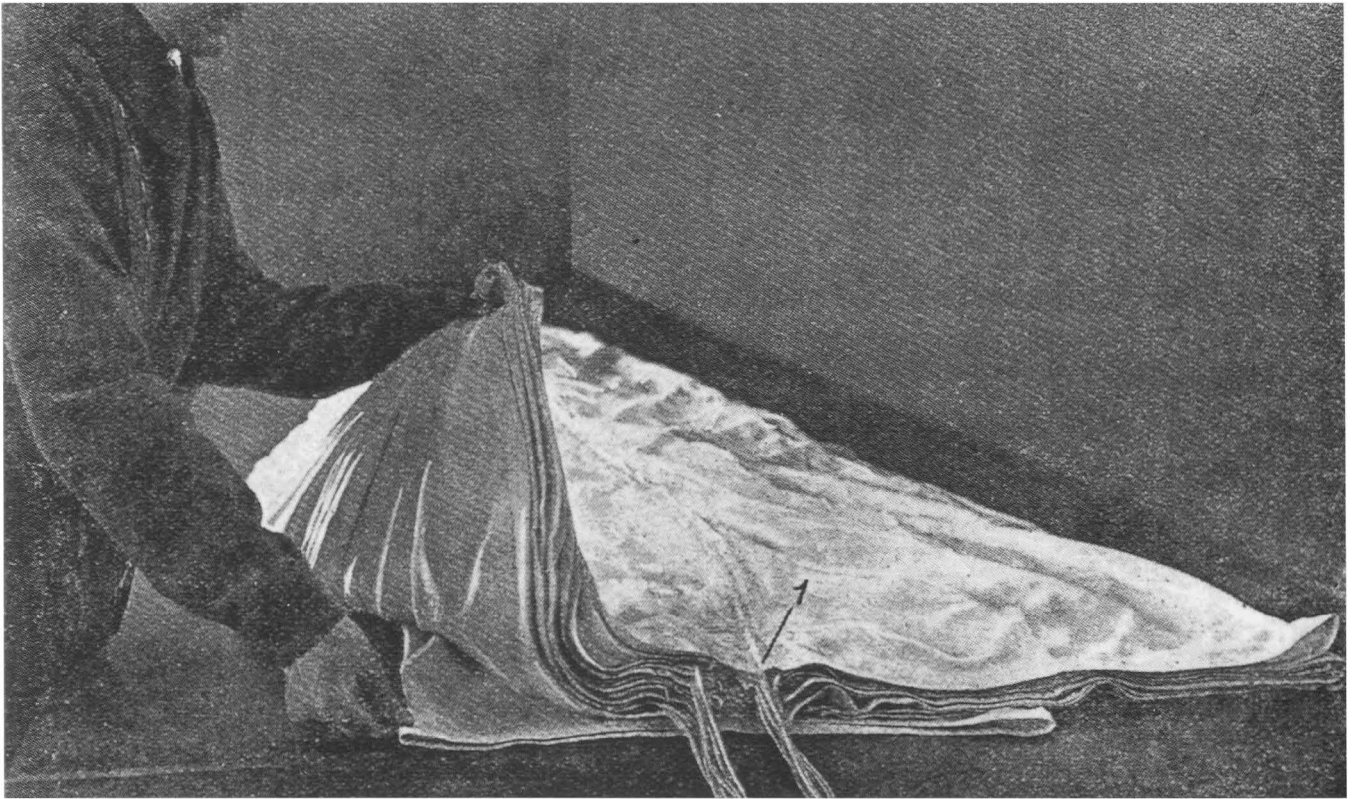
6.) The silk chute must be as shown in the photo with the sections numbered 1-10 to the left and the remaining 11-20 to the right.



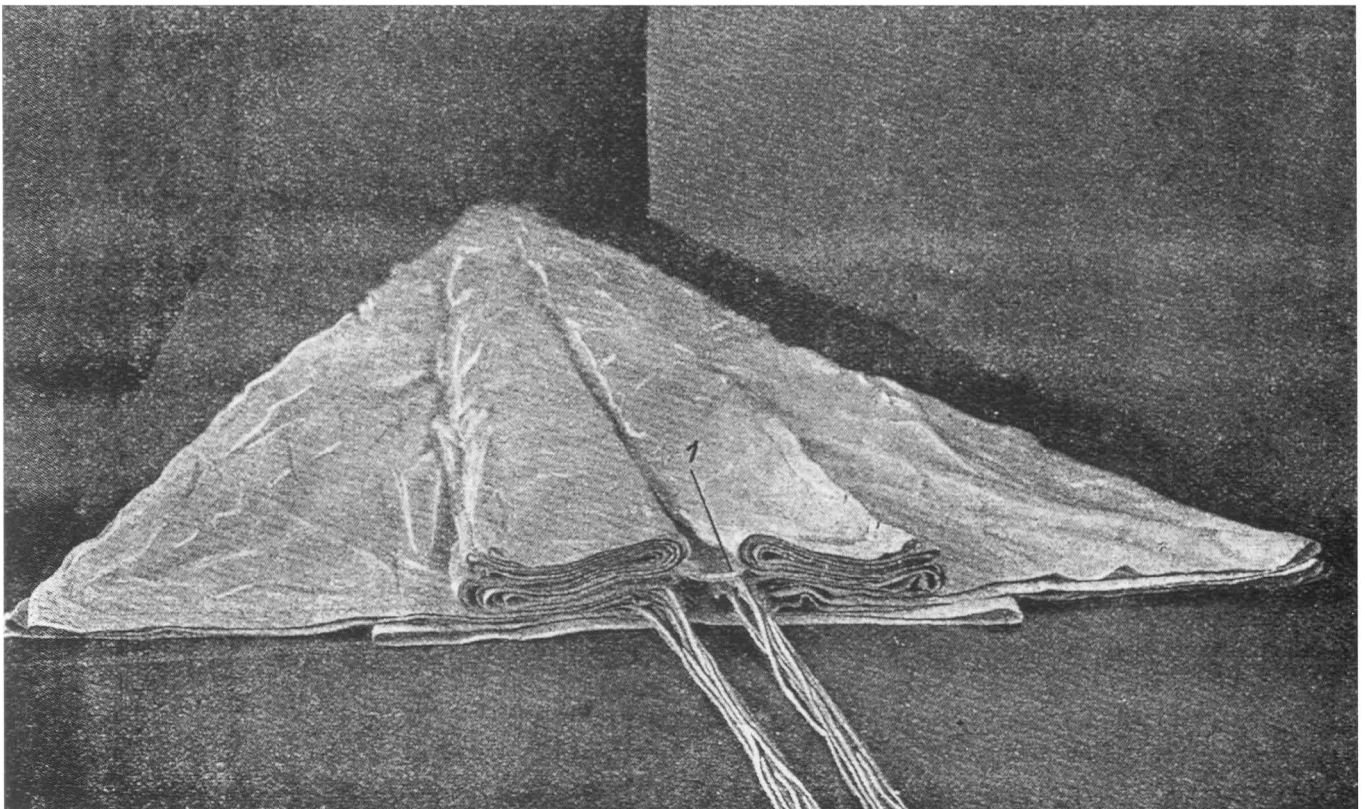
7.) starting from the base of the silk chute let the rope suspension system run through your fingers until you reach the ring harness.



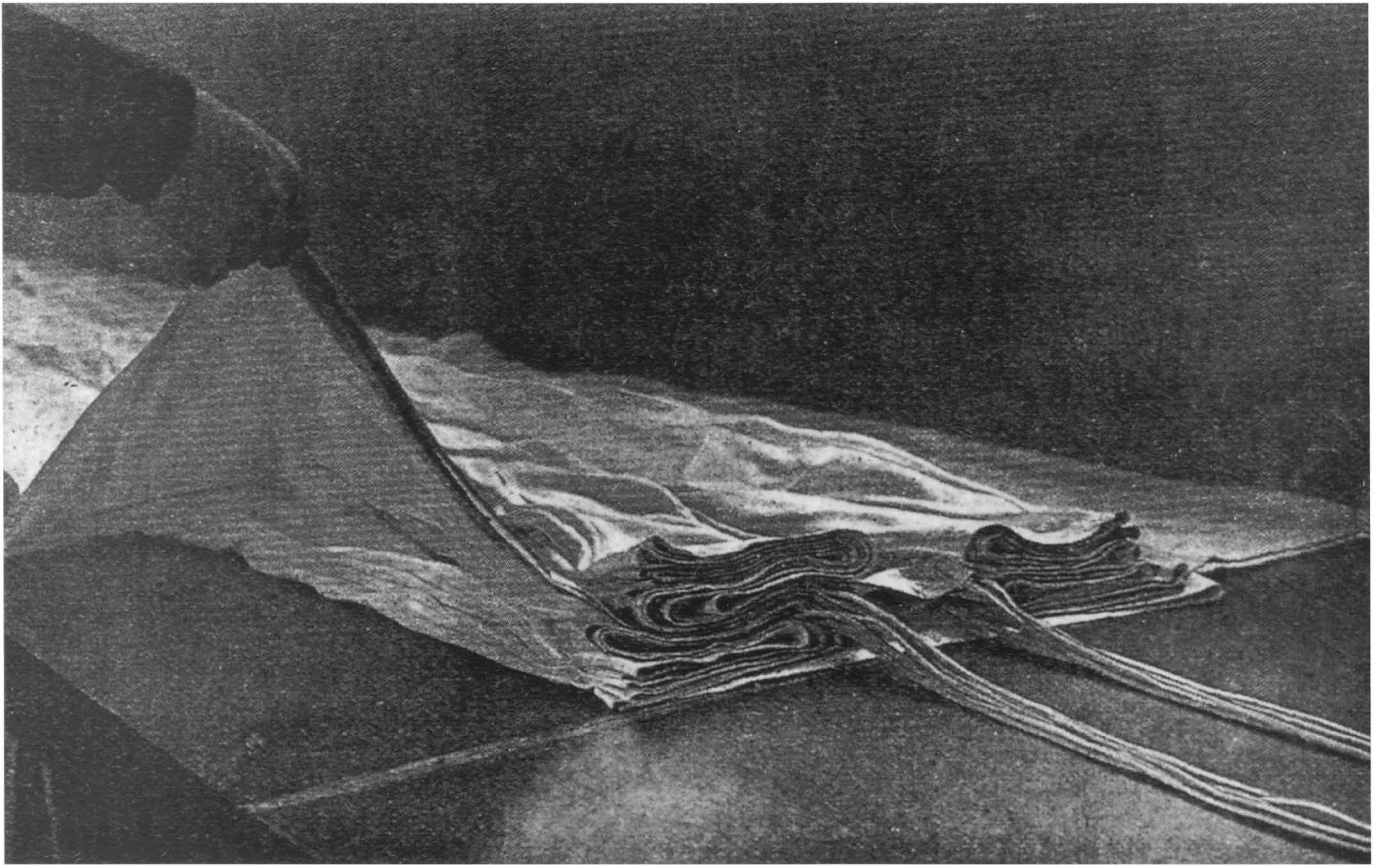
8.) Check that there are no tangles.



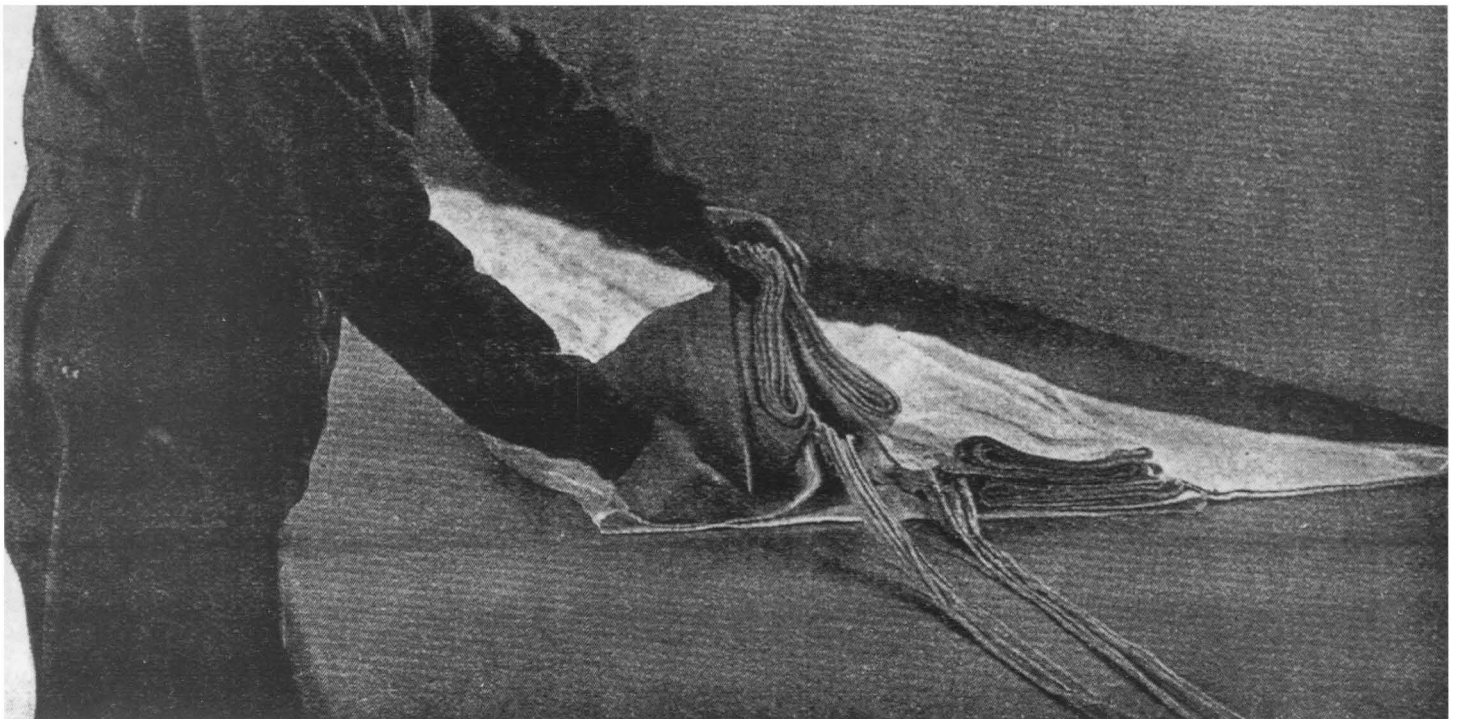
9.) slide the section between the ropes 10-11, as shown in the picture, so that it forms one of the four air intakes for the opening.



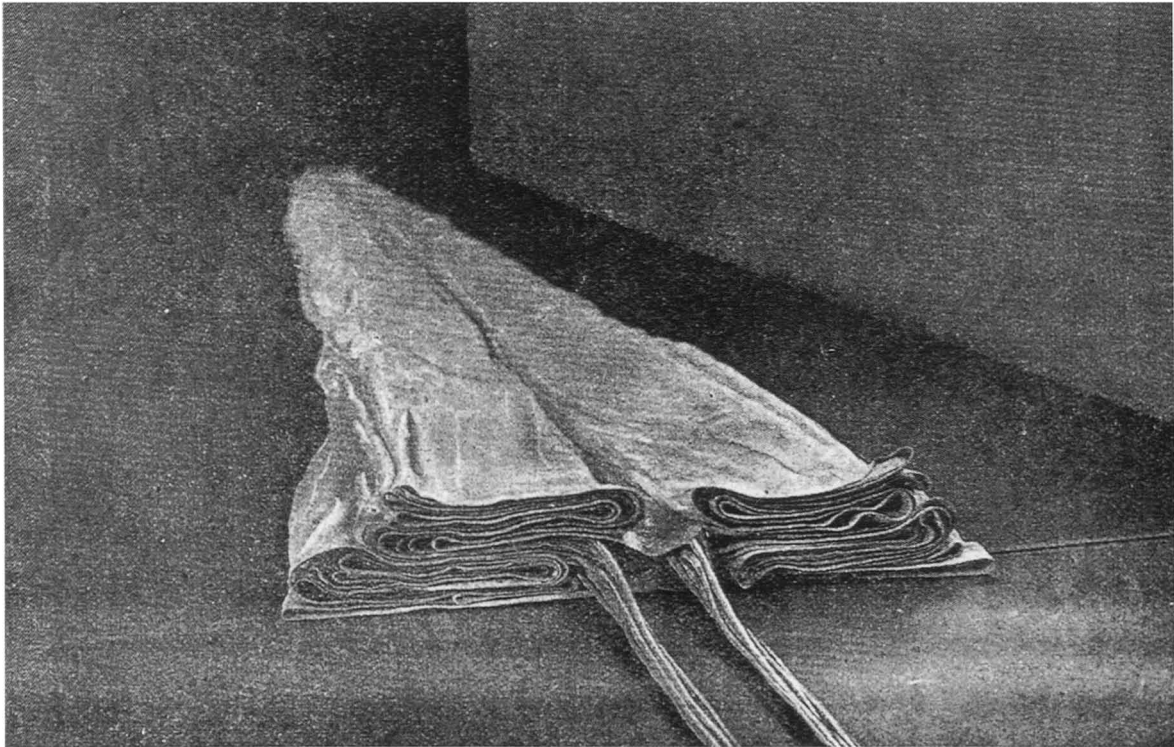
10.) Fold to the left of the folder in a "Z" fashion the sections between the ropes numbered 1-2, 2-3, 3-4, 4-5. Fold to the right of the folder in an "S" fashion the sections between the ropes numbered 20-19, 19-18, 18-17, 17-16, 16-15.



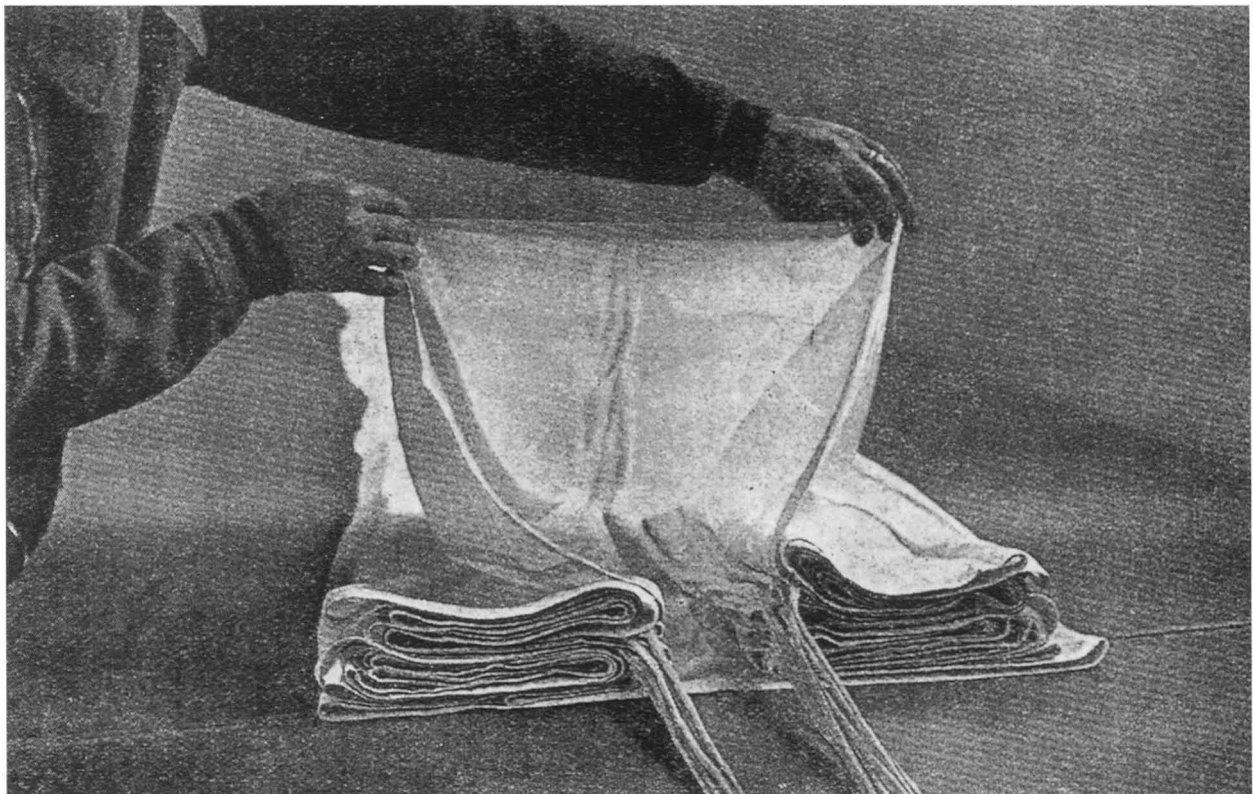
11.) Leaving behind the section between the ropes numbered 5-6, fold to the left of the folder in an "S" fashion the sections between the ropes numbered 6-7, 7-8, 8-9, 9-10. Leaving behind the section between the ropes numbered 16-15. Fold to the right of the folder in a "Z" fashion the sections between the ropes numbered 15-14, 14-13, 13-12, 12-11.



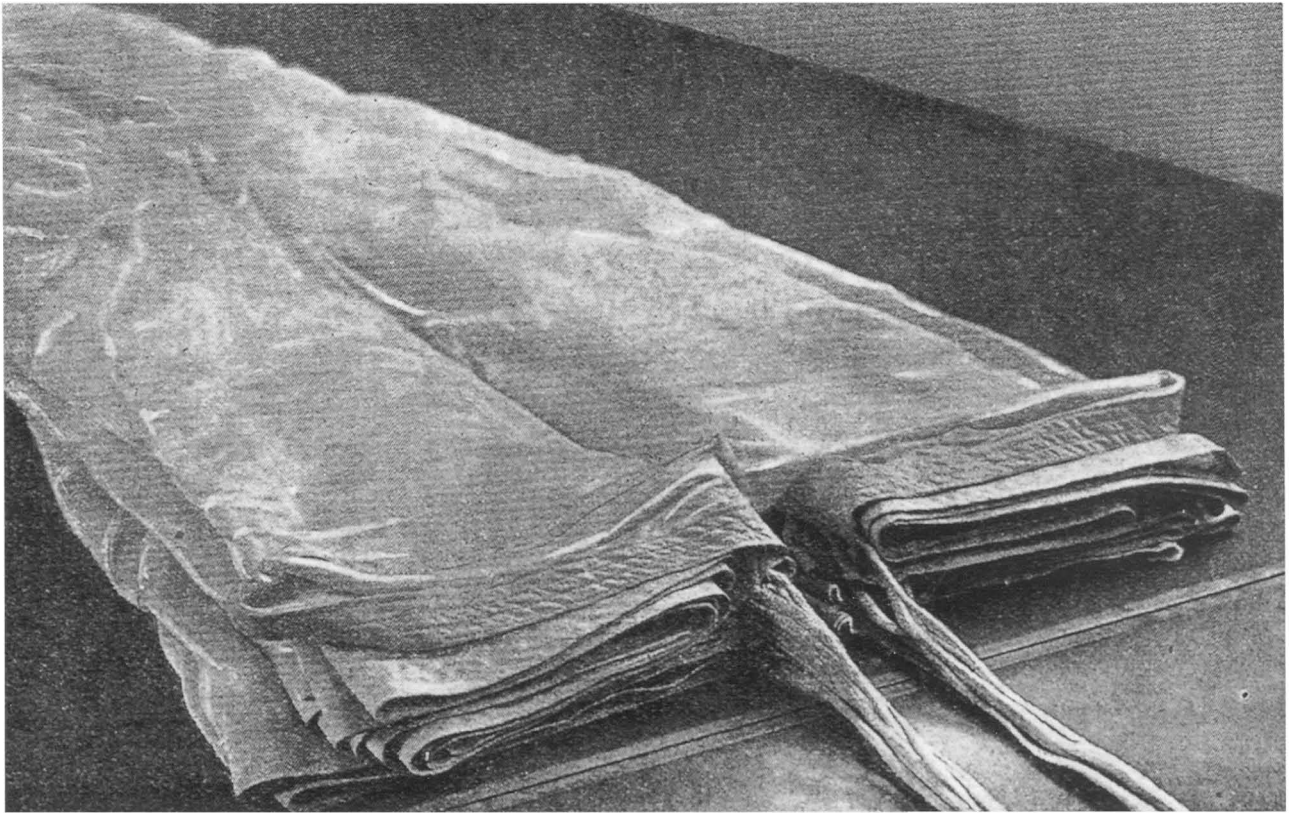
12.) The section between the ropes 5-6, that was previously left behind goes wrapped around the inferior sections that were previously folded in an "S" fashion on the left hand side. Thus forming the second air intake for the opening.



13.) The section between the ropes 16-15 that was previously left behind, goes wrapped around the inferior sections that were previously folded in a "Z" fashion on the right hand side. Thus forming the third air intake for the opening.



14.) The section between the ropes numbered 20-1 (located at the right of the folder, shown in the photo) creates the fourth air intake perfectly symmetrical to the section created between the ropes numbered 10-11 folded in step 9.



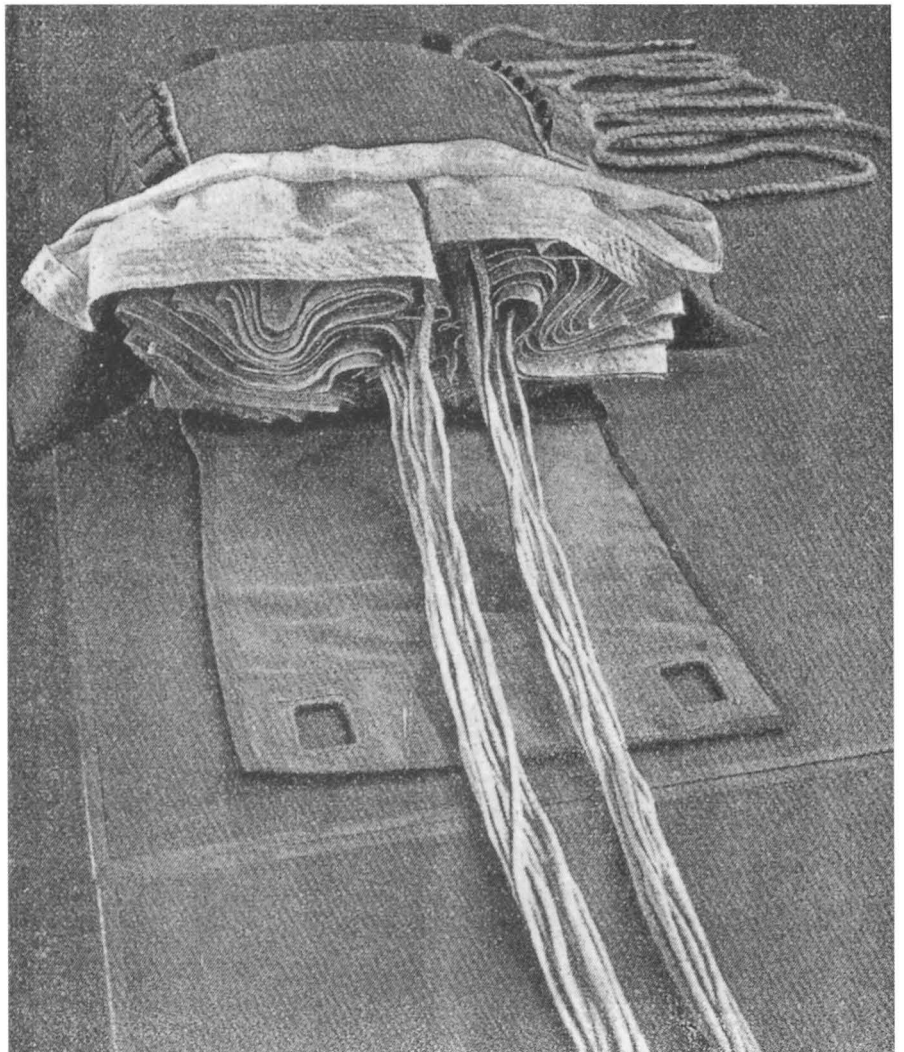
15.) Pay close attention when forming the fourth air intake, the hem of the section between the ropes 20-1 must be as shown in the photo. This is to aid the air intake.



16.) Place the silk chute into the sack starting from the rubber ring opening . . .



17.) . . . continue folding in a "Z" fashion . . .



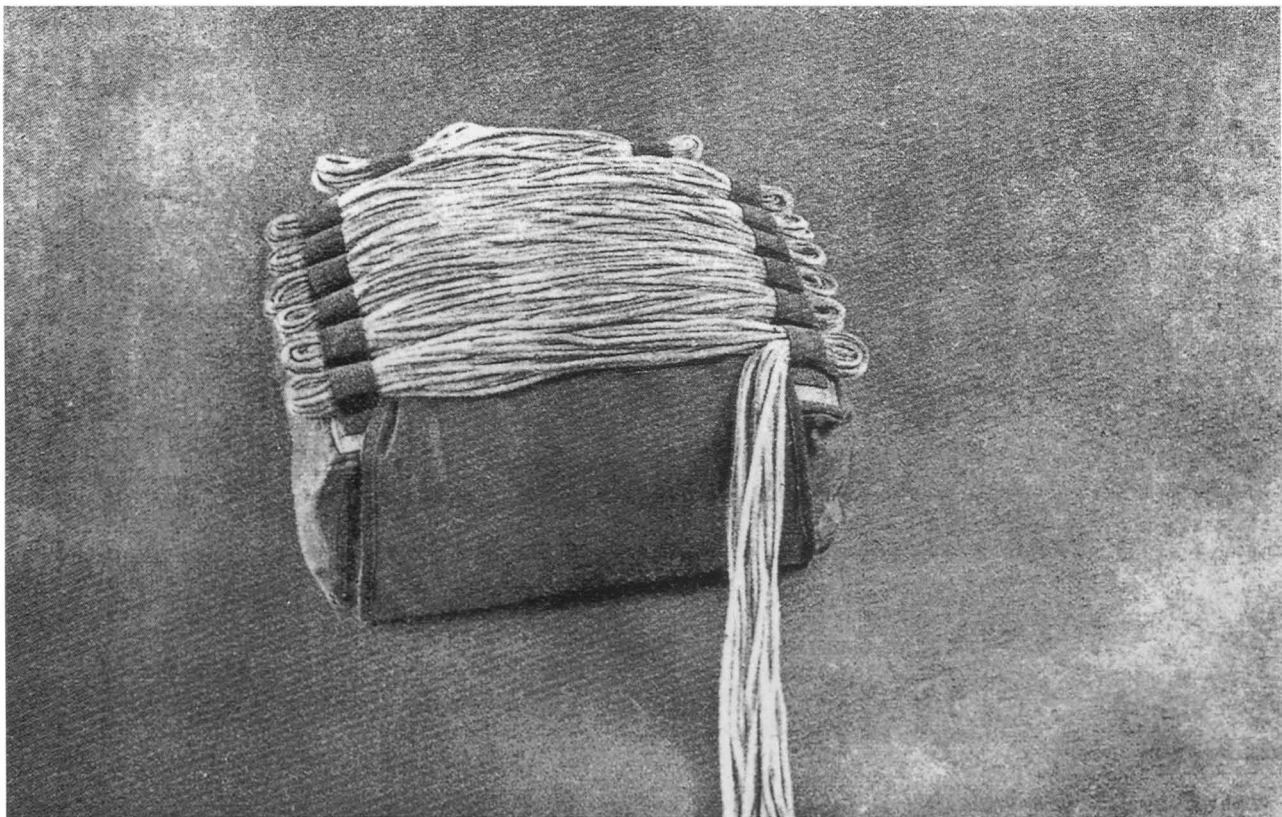
18.) . . . until you arrive at the hem of the chute.



19.) Close the sack and place the ropes as shown in the photo beneath the sack cover.



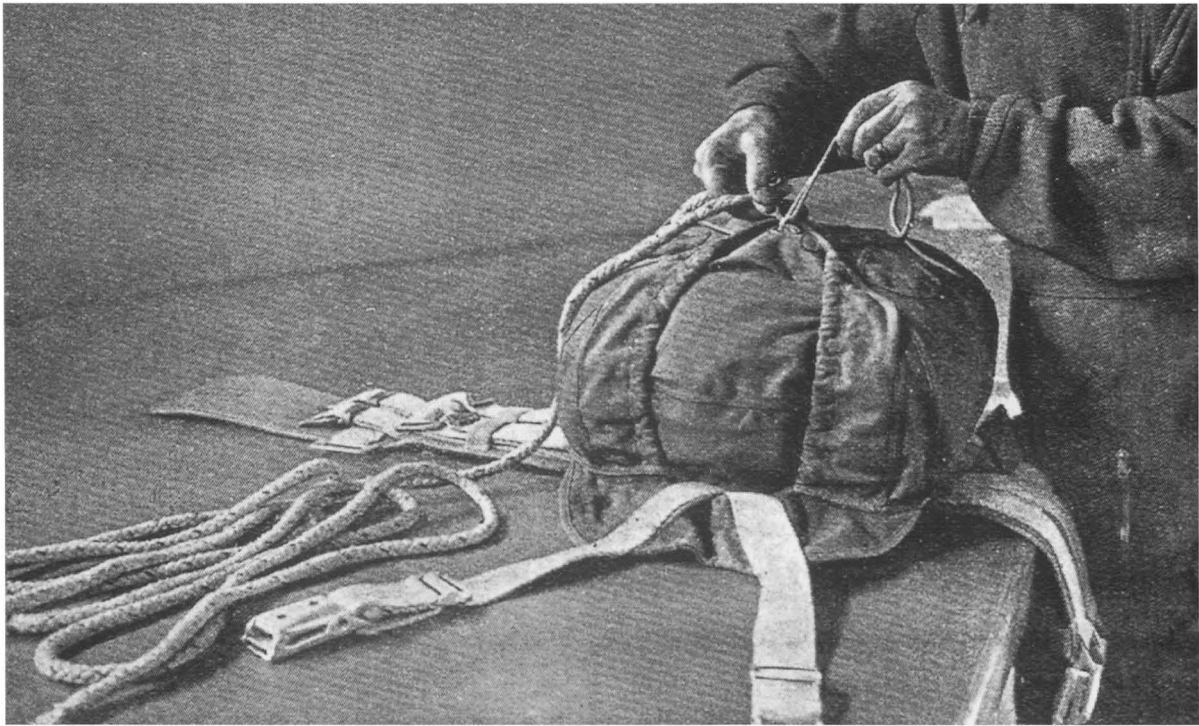
20.) Place the cord system in the elastic rings on the sack cover using the metal hook.



21.) The groups of ropes shouldn't have a loop more than three centimeters per elastic ring.



22.) Once completed, the organization of the ropes, place the sack near the shoulder straps and make sure the cord system is facing the bottom of the case.



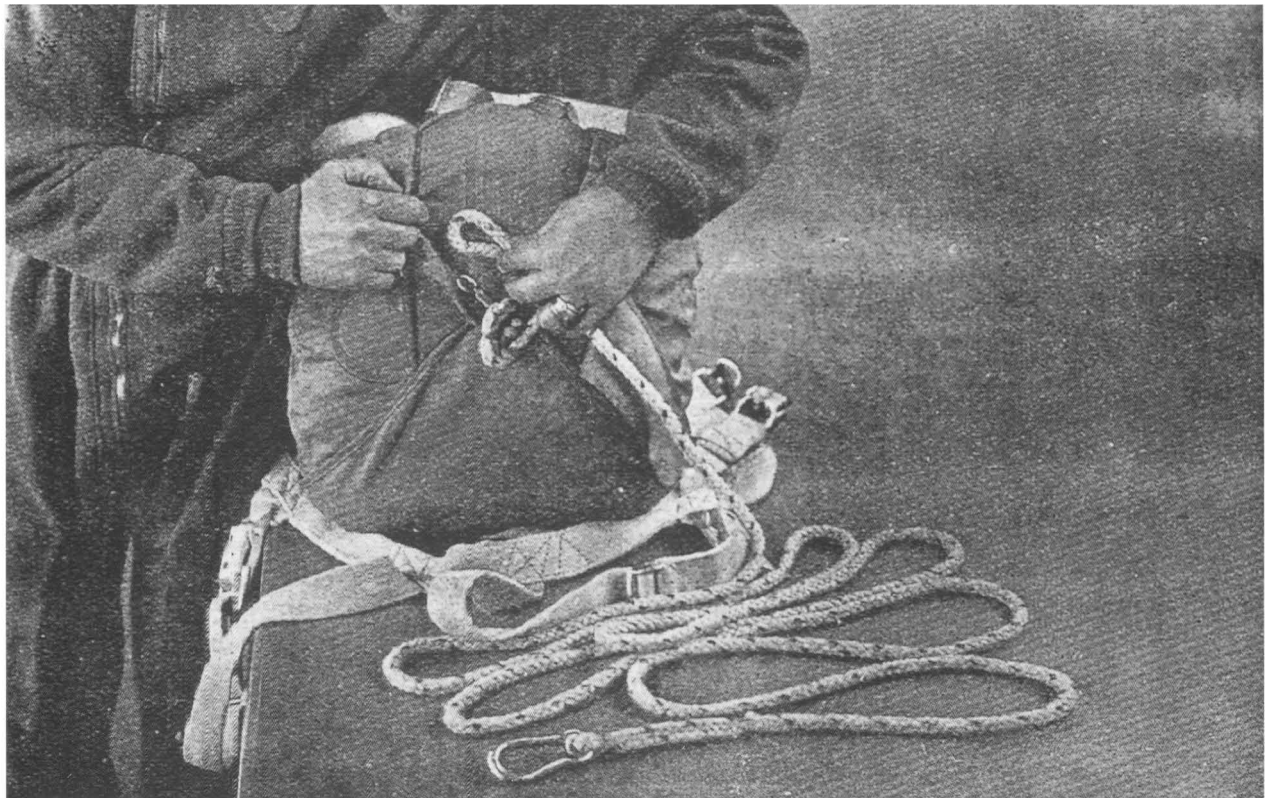
23.) Close the case in the following order:

i - close the flap with the elastic loop

ii - the flap on the opposite side

iii - the inferior flap

iv - finally the last flap gets closed by means of a cord to pull the elastic loop so that the metal pin can be inserted. The ring is then tied with a three kilogram break cord.

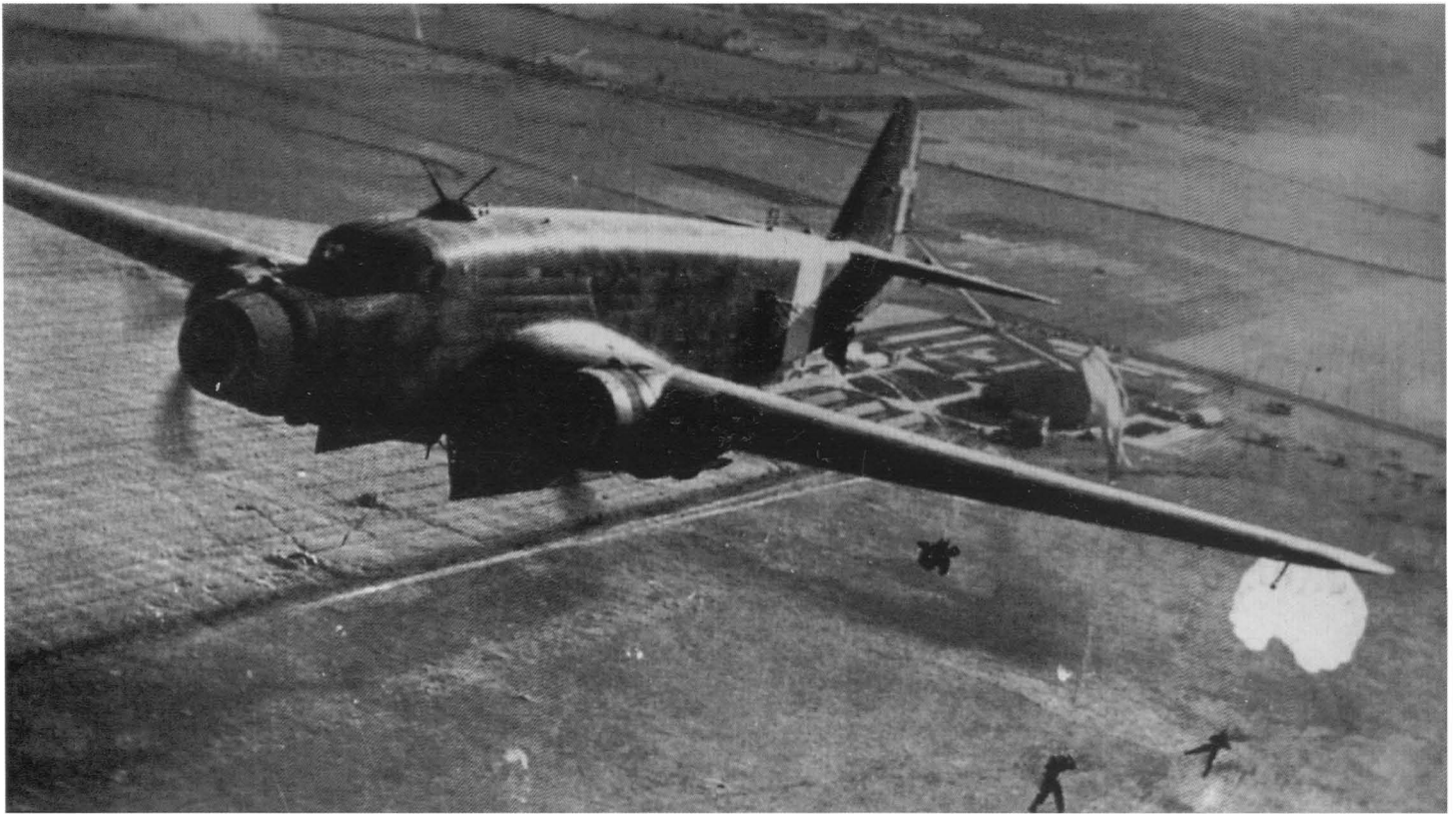


24.) S-fold the static line into its pouch.



25.) Place the static line snap hook in its pocket.

Note: IF41 SP packing instructions were translated directly from the Italian.



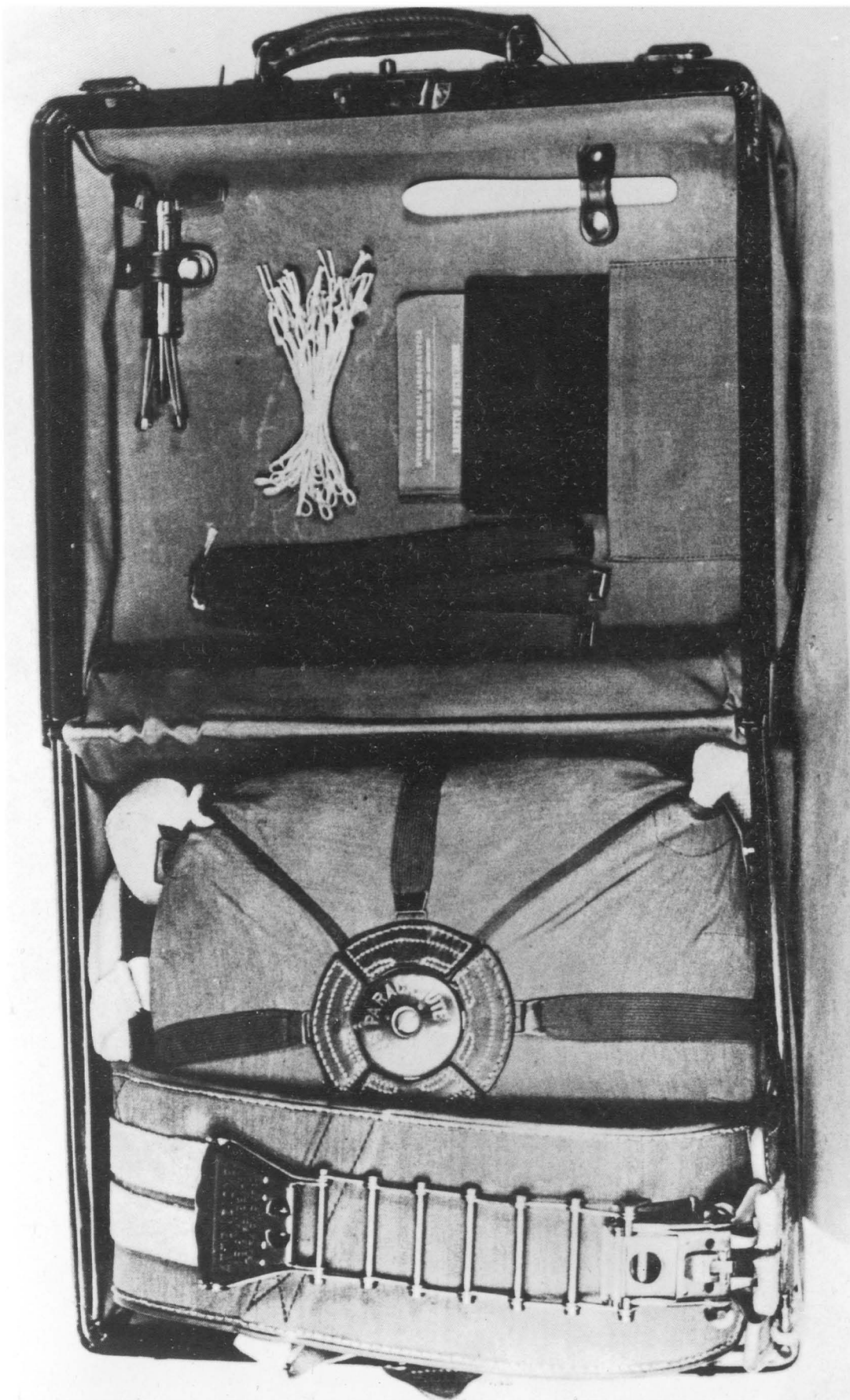
The Army conducted one combat drop 30 April 1941 of a company onto the Greek island of Cephalonia and suffered many landing related injuries due to the rocky terrain.

The Folgore Division fought in the western desert as mobile infantry. A second division, *Nembo*, was created for the projected assault on Malta April 1942.

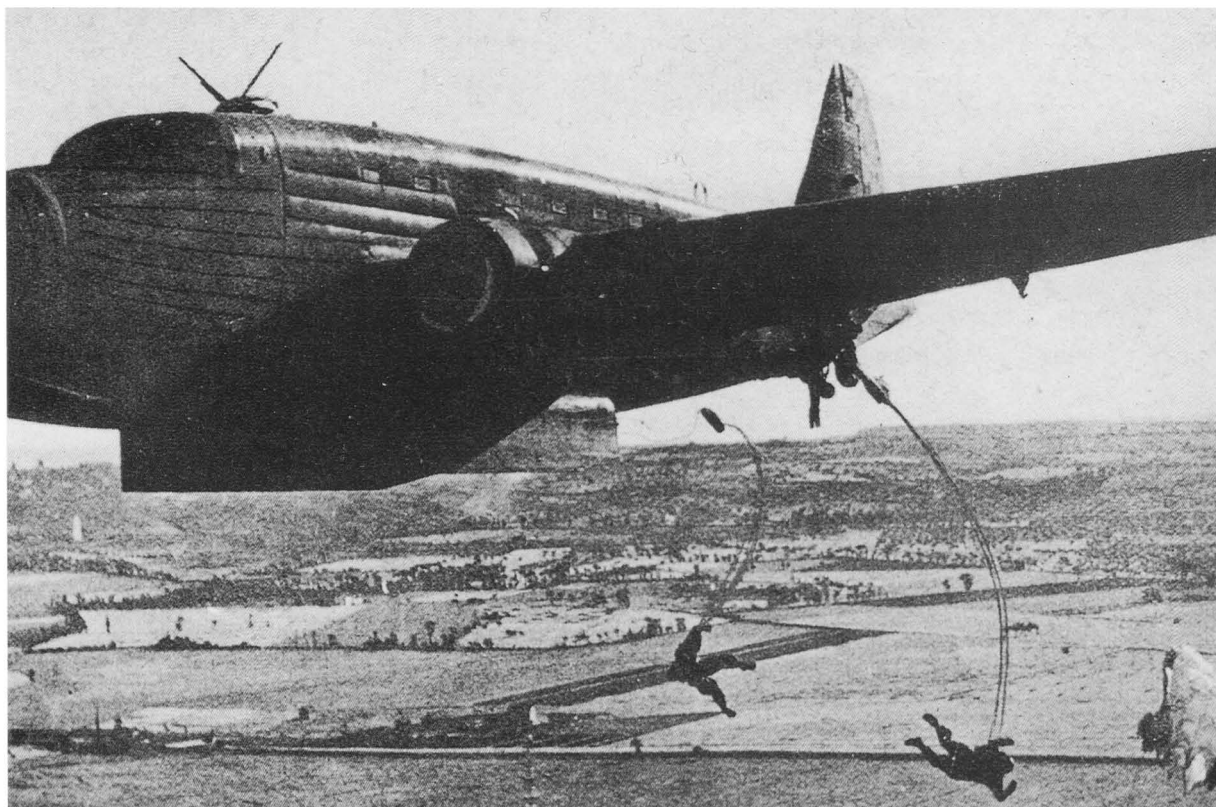
In December 1943, 160 Army paras were sent to Nr.4 school at Freiburg to be trained on the German RZ 36 returning to Spoleto mid-February 1944.

The X Regt. *Arditi* of the Army was more active, making three combat drops in Algeria – 14 January, 10 and 11 April. One in Tunisia 13 April near Duvivier. Then on the 13th of June in Algeria, Tunisia, and Cyprus with augmentation from the A.D.R.A. (Air Force paras). Finally Augusta Sicily on 20 July – all of these in 1943.

Three combat jumps were made by those who rallied to the Allies using British equipment: March 1944, 20 April 1945 and 30 July 1945.



The Salvator was marketed as a back, seat and dual system. Here a version is offered as a neat complete cased kit with spare pack opening bands, manual, extra ties and winding key.

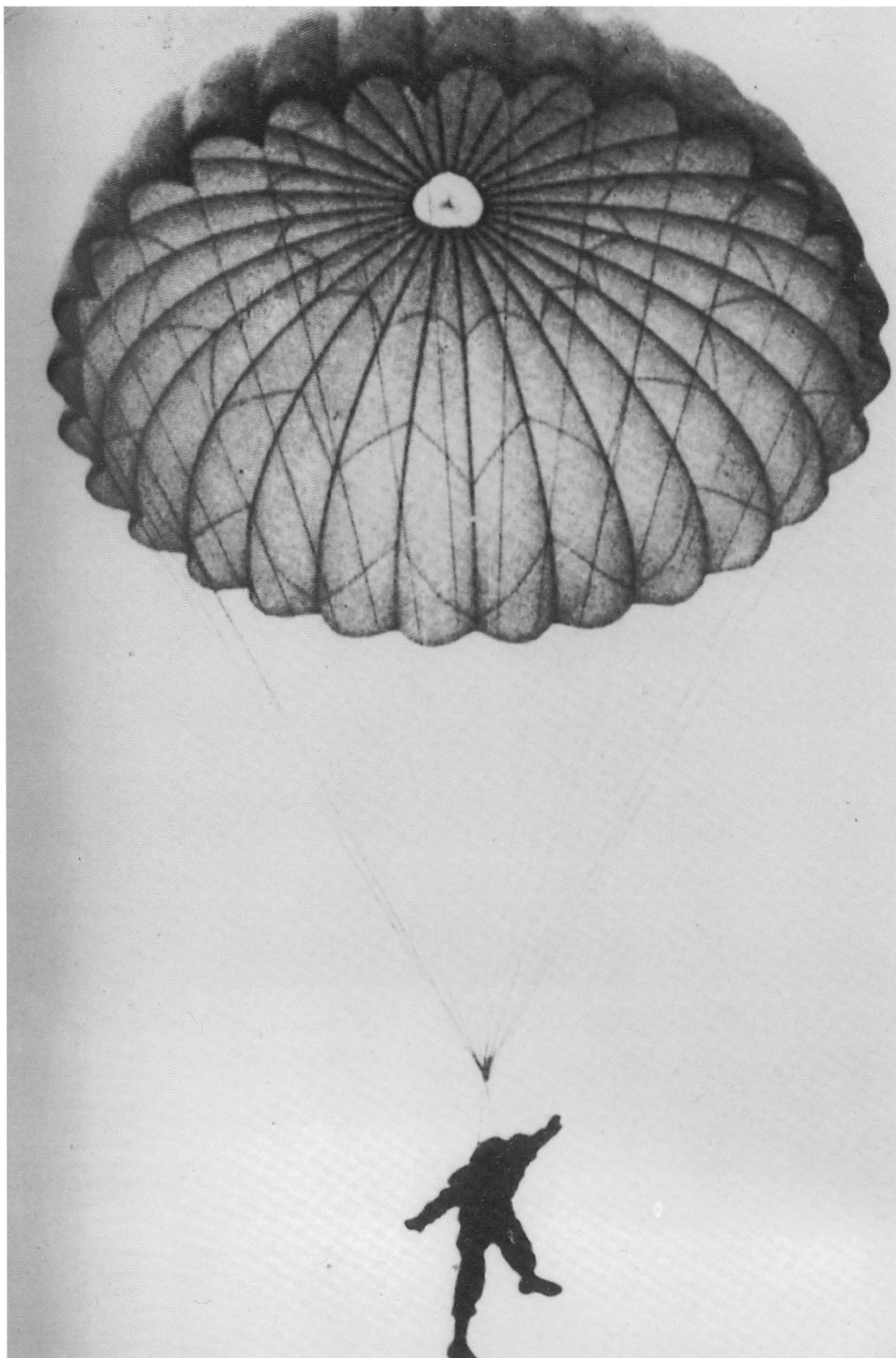


Jumping both doors of the SM 82. Note suspension lines extending from the deployment bags as a canopy begins to fill on the bottom right.



The uniformed troops wear the IF 41 SP, while the “casual” jumpers have the D 39.





Clear illustration of the German RZ system in operation. The jumper is pitched forward suspended by two risers from the waist and has no way to manipulate his canopy.



Germany

The German troop type parachute harness derived from the World War I aircrew escape Heinecke. This harness is functionally similar to the Italian Salvator in that the risers connect to D-rings at the waist, but is a parallel development (for a photo of the Heinecke see C.G. Sweeting p.79).¹² Since the Heinecke appeared in 1918 and the Salvator a few years later, it follows that the RZ harness owes nothing to Italian design.

This design seems odd when the Luftwaffe aircrews used conventional suspension back, seat and chest designs that were almost universal because of Irvin's empire (The Irving Air Chute Co. established licensed production in eleven countries).¹³

The German airborne began in secret June 1935 with thirty pilots at the Staaken aerodrome near Berlin. The experiment concluded January 1936 and the doctrine was established.¹⁴ German airborne doctrine stressed low altitude descents in order to reduce dispersion and deliver units intact and compact into the target area.

The RZ 1 was the first model and it may have been around since 1933. RZ is *Rückenpackung Zwangauslösung* which literally is 'backpacked forced release', meaning static line operated.

The RZ 1 was used generally 1936 to late 1939 (but kept reappearing after it was superseded) and is distinguishable by the vertical stowing of the static line on the right side of the container back. The RZ 1 container was not permanently attached to the harness but was temporarily connected by break thread between corresponding rings on the harness and container. The RZ 1 was bag deployed with the suspension lines stowed wound in large loose coils on the packed canopy inside the D-bag.¹⁵ The canopy was repacked detached from the harness.

The RZ 1 risers passed through slots on the bottom at each side of the container where they were secured

by break thread to small D-rings.¹⁶ This kept the container attached to the system via the risers, even though it was torn away from the harness at the connecting points on top.¹⁷ The six meter long static line was attached to the deployment bag loop through two small D-rings.

The RZ 1 had a defect said to involve the static line and referred to mysteriously in several books. This flaw is asserted to have been a fatal one for several troopers (six at the school near Spandau)¹⁸. Whatever the problem really was, it probably was closely related to the undisciplined manner in which the lines deployed, and that the deployment bag did not have a closing flap that locked the bag shut.¹⁹ Examination of period film footage shows the lines deploying in an abrupt whipping motion rather than being continuously taut.

The RZ 16 corrected the problem and it is identifiable by the static line being stowed horizontally on top of the container. The RZ 16 was supposed to displace the RZ 1 for all operations but apparently never completely did.²⁰ The canopies were undyed white. Both the 1 and 16 had harness D-rings that connected snaps on the leg straps. The chest strap and belly band were routed through friction adapters which securely fastened them and the loose straps were commonly wrapped about the joining to keep them from flapping in the breeze.

¹² CG Sweeting "Combat Flying Equipment," Smithsonian Press, Washington.

¹³ Ian Mackersey "Into the Silk" Robert Hale London 1956 p.21

¹⁴ FO Miksche "Paratroops" p.13

¹⁵ Brian Davis "German Parachute Forces 1935 - 45" Arco Pub. NY 1974 p.16

¹⁶ see photo "Fallschirmjaeger" Feist & McGuirl Ryton Pubs 1993 p.43

¹⁷ "Die Fallschirme der Fallschirmtruppe RZ 1 und RZ 16 und ihre Wartung" L.Dv. 5201 Jan 1941 p.17

¹⁸ F.O. Miksche "Paratroops" Random House NY 1943 p.13

¹⁹ "Die Fallschirme der Fallschirmtruppe RZ 1 und RZ 16 und ihre Wartung" L.Dv. 5201 Jan 1941 p.17

²⁰ see "Green Devils - German Paras 1939-45" Jean-Yves Nasse Histoire & Collections Paris p.13

The RZ 16 used a deployment bag which had a closing flap locked shut by static line stows.²¹ Six sets of hesitator loops stow the bulk of the suspension lines on top of the bag. The lines were fully paid out before the final recessed set were pulled off opening the bag and allowing the canopy to be snatched out. The static line was attached to the top of the bag by a cloth loop instead of the double metal ring arrangement of the RZ 1.²²

The RZ 1 was used to drop mountain troops into Norway²³ and may well have been used in Crete.²⁴

Motion picture footage purportedly taken over Holland shows the RZ 1 and RZ 16 in use by paras in the same stick.

The canopies varied in actual diameter 25'10" to 26'9" to 27'4" to 27'10" to 28'0" with usually 22" apex vents (one example – the largest measured – had a 32" apex vent). The RZ 20 weighs 11.5kg (25 lbs.).

The fabric was a rayon based synthetic and highly permeable. Since the suspension by two risers was from points just above the waist, the jumper was tilted face forward. There was no possible way of controlling the canopy as pulling down a riser would have no effect, nor could the jumper reach the suspension lines. Landing under an RZ was fraught with peril, and indeed injuries were common. Jumpers were taught to swing their legs in a running motion to affect a turn. Motion picture footage of the time shows that this flailing activity actually turns the parachute by inducing small oscillations.²⁵

The risers were actually hemp ropes tied together and running down from the confluence of suspension lines to small loops with attached snap hooks that connected to harness D-rings. These hooks were further secured by pins that locked the hook spring gates shut. The pins were threaded for a small hex nut. All this meant that the canopy could be conveniently removed for repair, replacement, or untangling snarled lines. The suspension lines radiate from a point that is actually four loops which are continuations of the riser ropes. The lines are tied off seven per loop by the conventional clove hitch-half hitch secured by zigzag stitching. The braided lines on the RZ 20 are usually dyed brown.

The static line was permanently attached to the deployment bag at a loop on top off the bag. The static line (RZ 20) is a braided undyed rope that varied in length from about 16'1" to 17'7". The D-bag is slightly tapered at 13" each side and top but 16" wide at the bottom. The closing flap that seals the canopy inside is 11 1/2" long and has a tapered extension with two square sewn grommets that fit over cloth loops where the closing flap is locked by suspension line stows. The remainder of the suspension line is stowed by S-folds under six cloth loops. The suspension lines are 20'4" to 21'4" long. All the hardware appears to be cadmium plated for rust resistance, which was and is a common process.

The RZ harness appears surprisingly flimsy particularly when examined beside the contemporaneous T5. It must have been adequate to the stresses imposed, therefore opening shock perceived by the jumper must have been light, but not especially comfortable.

The container closing pin was a tapered, cadmium plated steel piece 54mm long placed 16' and 1 to 4 " from the snap hook and fixed to the static line by a cord interwoven into the line. The closing pin held the container flaps shut by passing through a cord loop that was routed through brass grommets at the end of each flap. The static line snap hook was a simple robust piece with a spring loaded gate that was locked by a clever spring closed U-shaped tab.

The RZ system had one saving virtue, it was bag deployed. (On most systems, the canopy and the bag were both serial numbered. These numbers should agree on an original system.) This means the suspension lines were fully unstowed and extended before the canopy was unpacked. This reduced the shock on the load (jumper), made the opening sequence an orderly process and reduced stress on the whole system. It opened quickly, because it was a small system with no break cord. Pilots dropped troops at a sedate 75-85 mph²⁶ IAS from the Ju 52 tri-motor. The canopy would be fully open within about 100 feet. The RZ 16 had two tactical vices: the canopy was glaring white and the harness was too slow to get out of.

²¹ "Die Fallschirme der Fallschirmtruppe..." p.38

²² "Die Fallschirme der Fallschirmtruppe..." p.17

²³ Nasse p.23

²⁴ Nasse p.31

²⁵ "Fallschirmjaeger" film 1939

²⁶ telephone conversation with former Luftwaffe pilot Herman von Gehm 10 Dec 1996

The RZ 20 rectified these deficiencies with a tricolor camouflage pattern (green-brown-black) and quick release hardware. Quick releasing it was! A light finger-thumb pinch on each end of the locking barrels depressed spring locked plungers that discharged a spring loaded delta-shaped gate which secured a rectangular connector attached to a leg or chest strap. Two pinches with both hands, the hardware flies apart and the sky soldier is free. Both the RZ 16 and the RZ 20 appeared over Crete.

Fears expressed at the time that the dyed canopies were unsafe has some basis in fact. Dyed silk is weakened by the process. The rumor was false because the canopies were made of synthetic cloth.

The German exit technique has generated much comment, as it appears to be dramatic and featured prominently in the propaganda war of the day. The RZ pack is a bulky round bundle in the center of ones back, the Ju 52 door is small and an average size man must crouch to stand in it. A dive exit is a perfectly reason-

able way for the jumper to clear the airplane and keep ones person away from the developing parachute.

There was no dispatcher or jumpmaster, the co-pilot served this function by yelling commands back into the cabin. "*Fertig machen!*" = Get Ready! At which the *Jägers* stood and clacked their snap hooks onto the cable overhead. "*Fertig zum absprung!*" = Get ready to jump! They moved to the door with the first man crouched down both feet wedged in the frame. The GO signal was a horn blast and they dived out. .

The *Fallschirmjäger* boarded the tri-motor clamping the static line between their teeth. Lacking the boarding ladders, the Ju 52 door is rather a high step: left foot on the trailing edge, right foot in the sill, both hands are needed to grasp the vertical hand rails. You put the static line where you can get to it quickly. The *Jägers* only had one parachute, if they have to leave that bird early, they must snap that static line onto the anchor line cable in an instant. All paratroopers can appreciate having positive control over that snap hook at all times.²⁷



²⁷ Feist & Harms "Fallschirmjaeger in Action" Squadron/Signal Carrollton TX 1973 p.8 and Roger Edwards "German Parachute Troops" Doubleday Garden City NY 1974 p.17

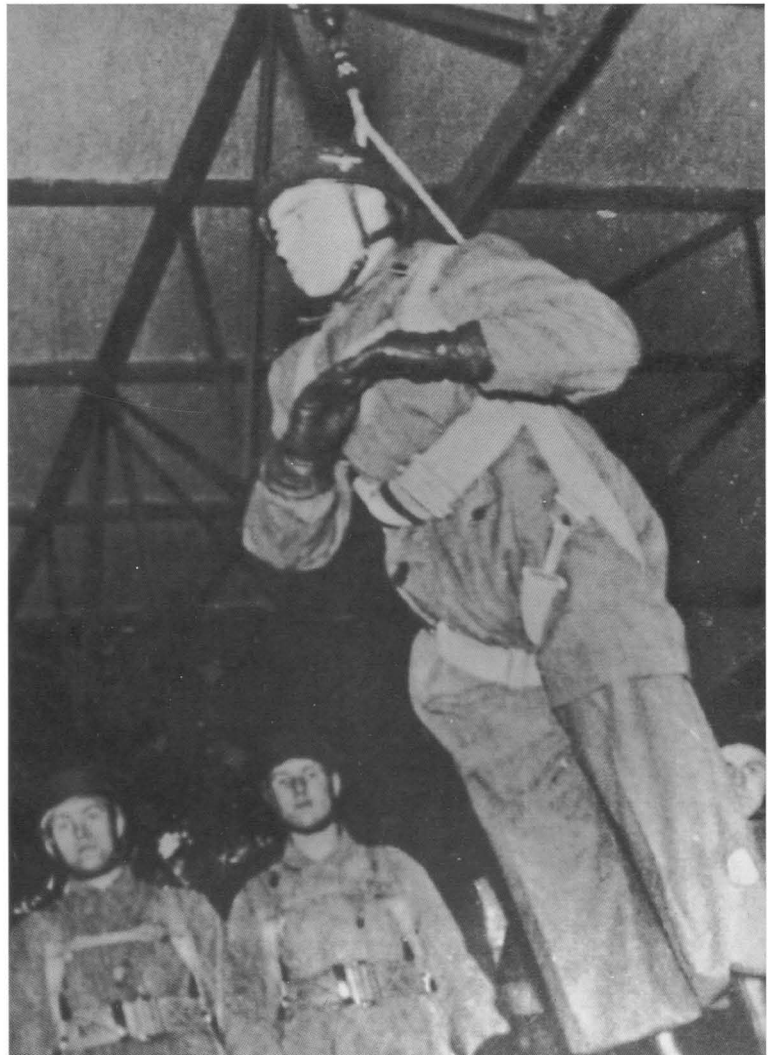
- STATIC LINE STOWED VERTICALLY ON CONTAINER
- CONTAINER SEPARATE FROM HARNESS
- SMALL D-RINGS ON BOTH SIDES OF CONTAINER AT BOTTOM
- CHEST STRAP & BELLY BAND JOINED BY FRICTION ADAPTERS
- LEG STRAPS HAVE SNAP HOOKS
- CANOPY UNDYED (WHITE)



RZ 1



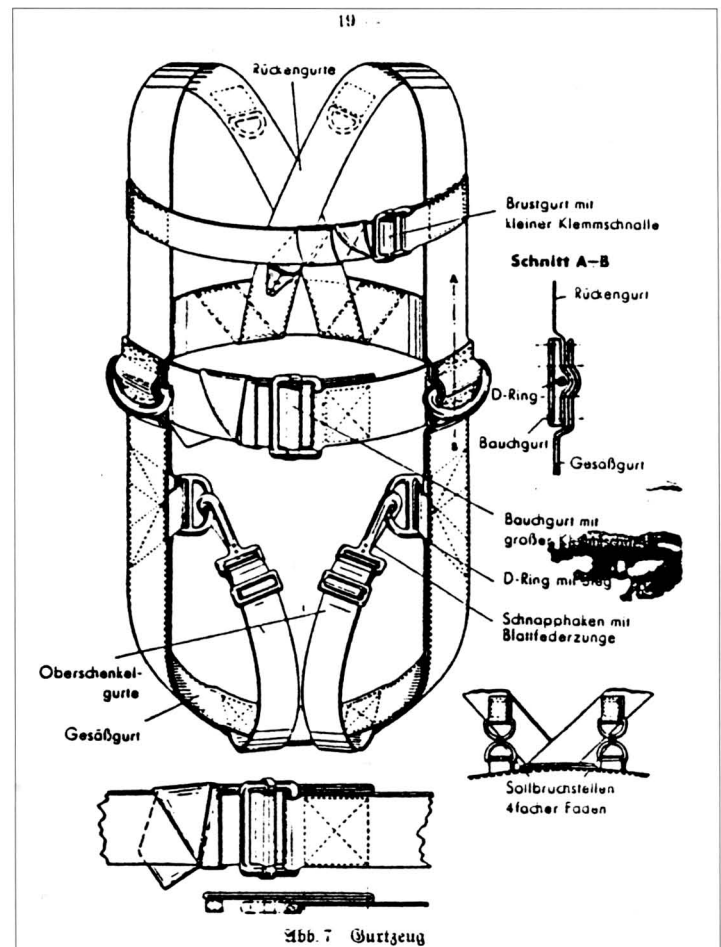
Exit practice. The RZ 1 always routed the risers from the container bottom and is readily identified by the rings there to which break thread is tied.



The RZ harness suspended the jumper from the waist. This apparatus releases the student for landing training.



This Jäger is wearing an RZ 1 because of the absence of container extensions sewn to the harness.

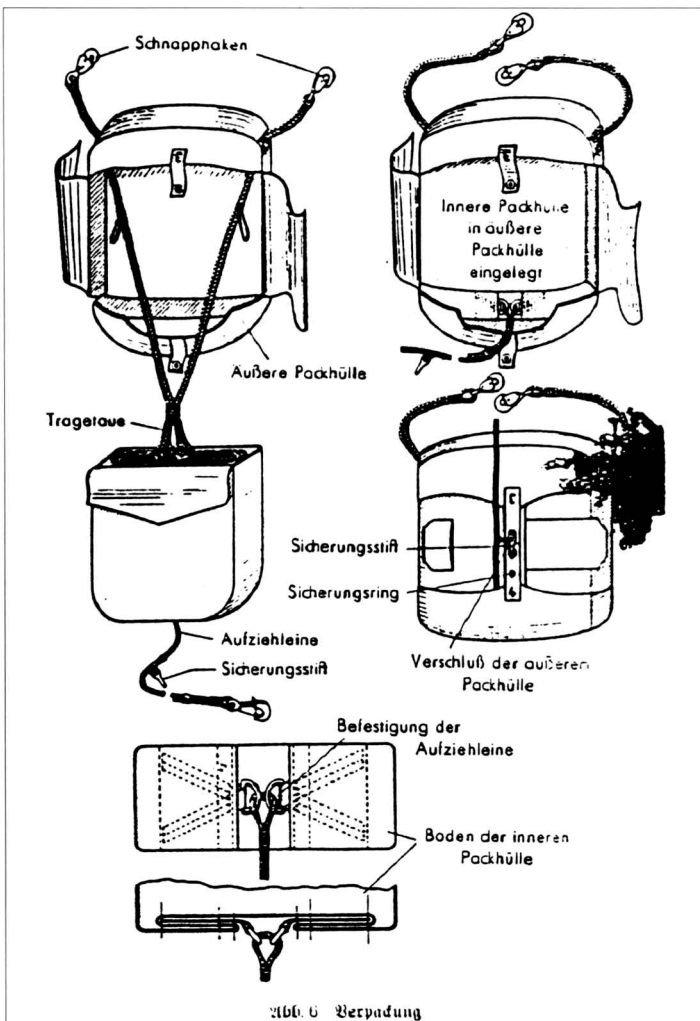


2. Einstellen des Gurtzeuges

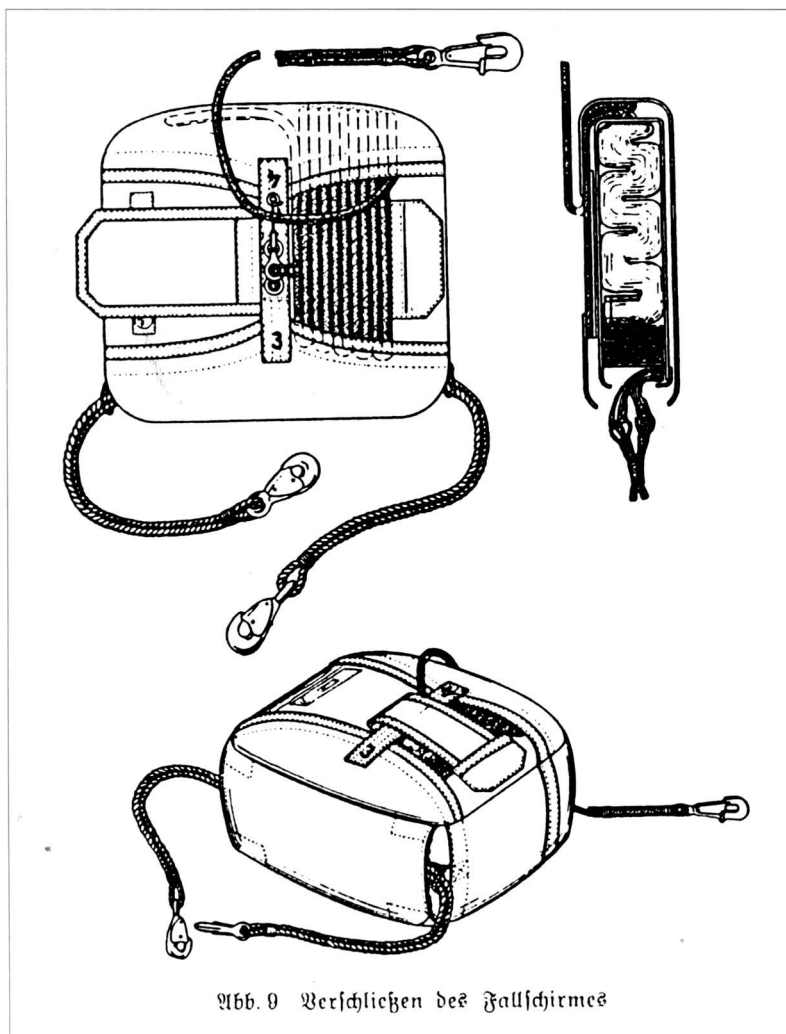
25. Das Gurtzeug ist so zu verpassen, daß es nicht zu stramm, aber auch nicht zu locker um den Körper liegt. Der Mann muß sich frei bewegen können. Die Einstellung erfolgt durch Verstellung der Oberschenkelgurte.

Diagram of the RZ 1 harness. Note the small D-rings at the top on back that temporarily secure the container with break thread. This harness owes nothing to the Smith/Irvin pattern.

Troops of the Army's Parachute Battalion rig up circa 1938. They were absorbed into the Luftwaffe in 1939. The RZ 1 container is completely separate item from the harness.



The manual shows how the packed deployment fits into the container, shown here inverted.



The RZ 1 container in packed condition with static line stowed. It is ready for attachment to harness.

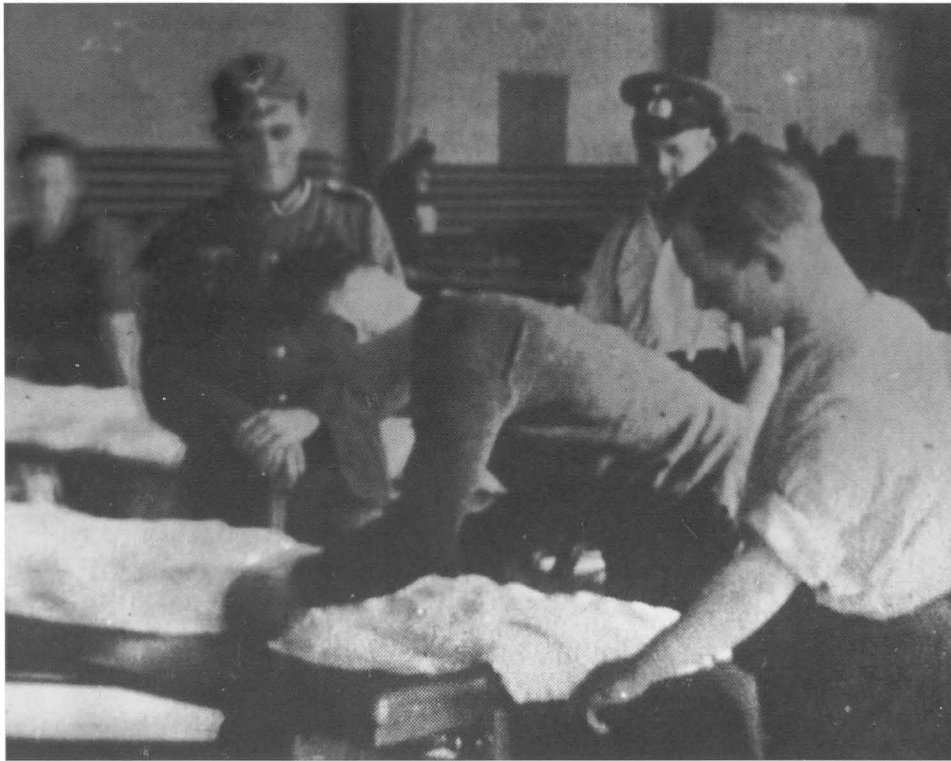
Hanging canopies to shake out dirt and debris. They were also left this way to dry out.



Exit practice from a mock door. This was also performed as a group effort with the trainee diving straight out to land flat on a canvas tarp held by his fellows.



These photos show how the canopy was folded into the RZ 1 deployment bag, followed by the lines which were placed in coils on top.

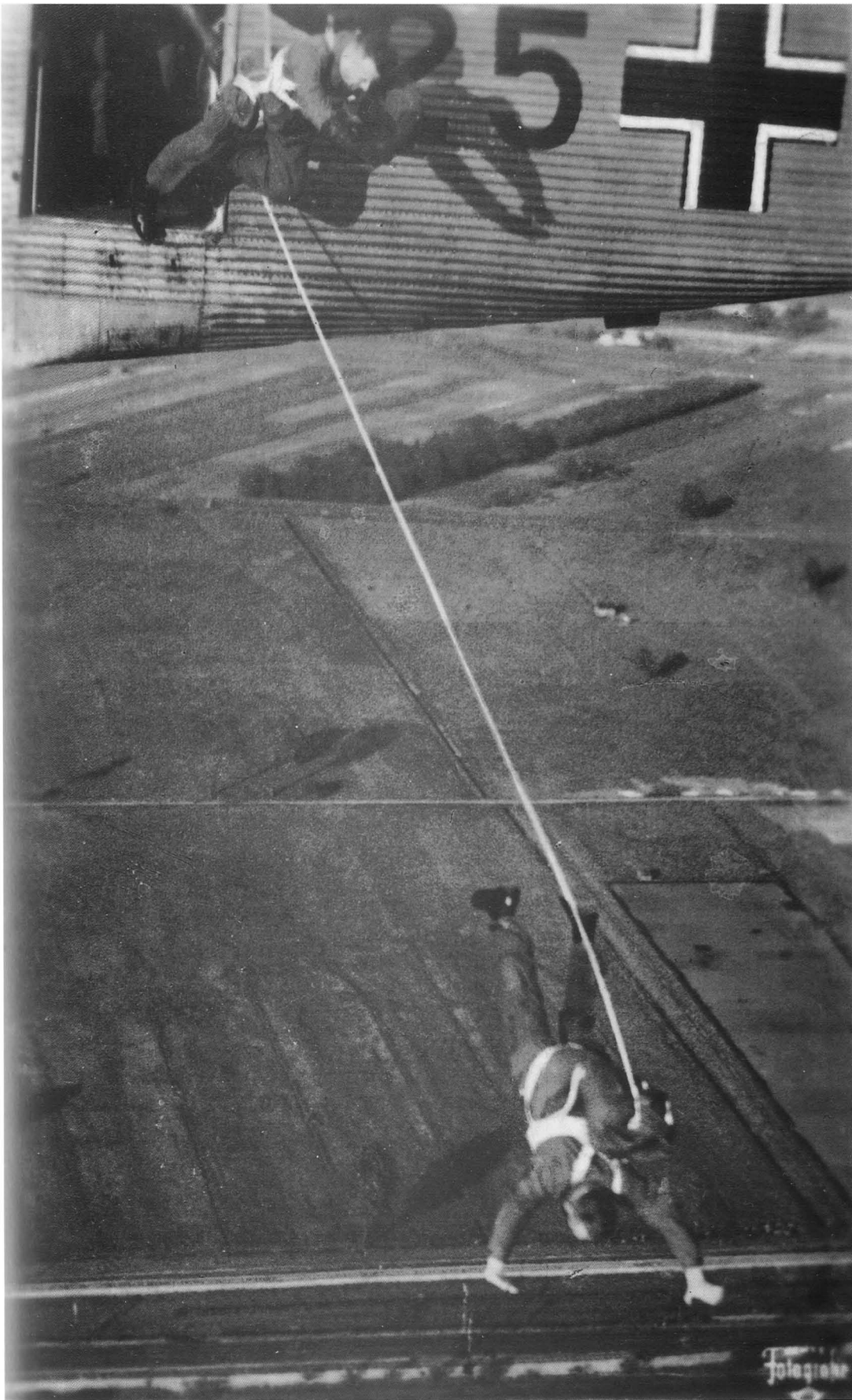




The suspension lines converge to a single point at the risers shown here draped off either side of the bag.



The packers place the filled container on the harness back and connect the riser snaps to the harness D-rings.



These bareheaded troopers are jumping with the RZ 1. The container is a separate package from the harness. Note how the bundle has risen up on the back of #2.



The RZ 1 lines were drawn from the deployment bag in an abrupt manner – loose in the slipstream. Here the container, retained by the risers, has blown up behind the jumper's neck.

- STATIC LINE STOWED HORIZONTALLY ON TOP
- CONTAINER SEWN TO HARNESS
- FRICTION ADAPTERS. SNAPS & D-RINGS LIKE RZ 1
- CANOPY UNDYED (WHITE)





The RZ 16 retained the same snap hardware as its ancestor, but the container was non-detachable and the static line was mounted on top. Considering the suspension, the knee pads were a popular option.



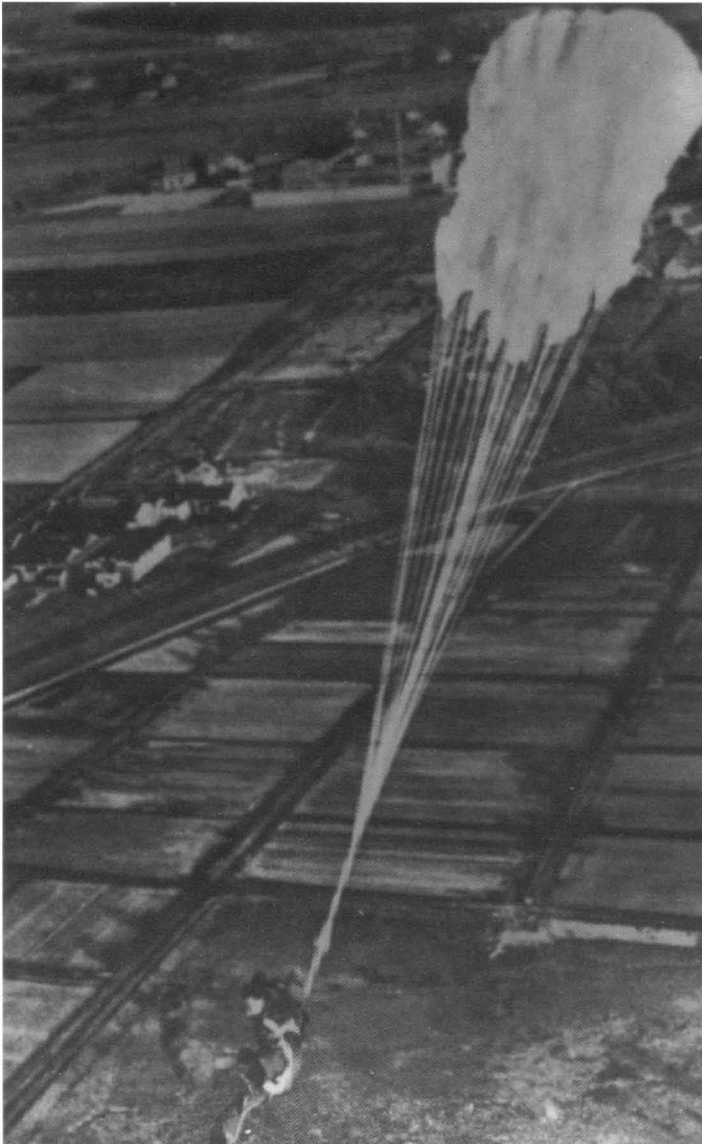


Famous boxer Max Schmelling helps a comrade don his RZ 16 prior to a winter weather jump.



The static line is stowed under pockets that are puckered by strong elastics.

Suspension lines unstowing from D-bag. Most likely an RZ 16.



Canopy "squids," lines stretch as it inflates from the top. Jumper is bareheaded.

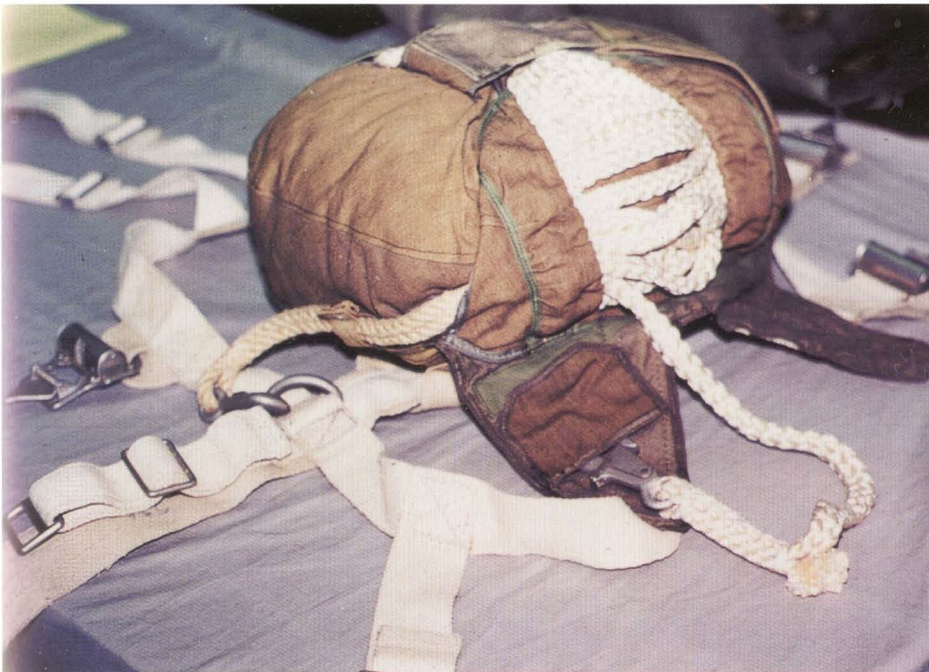
- FOUR QUICK RELEASE DEVICES
- STATIC LINE STOWED HORIZONTALLY ON TOP
- CANOPY DYED CAMOUFLAGE
- CONTAINER SEWN TO HARNESS





The RZ 20 is immediately discernible by the tubular quick releases on each strap.





The small pocket is for the snap hook. The container on this RZ 20 was made from fabrics of three different shades.

The quick release locking gate is the wedge shaped piece that captures a square ring.



RZ 20



The RZ 20 serial number will be found on the container data panel, on the deployment bag and the packing booklet.

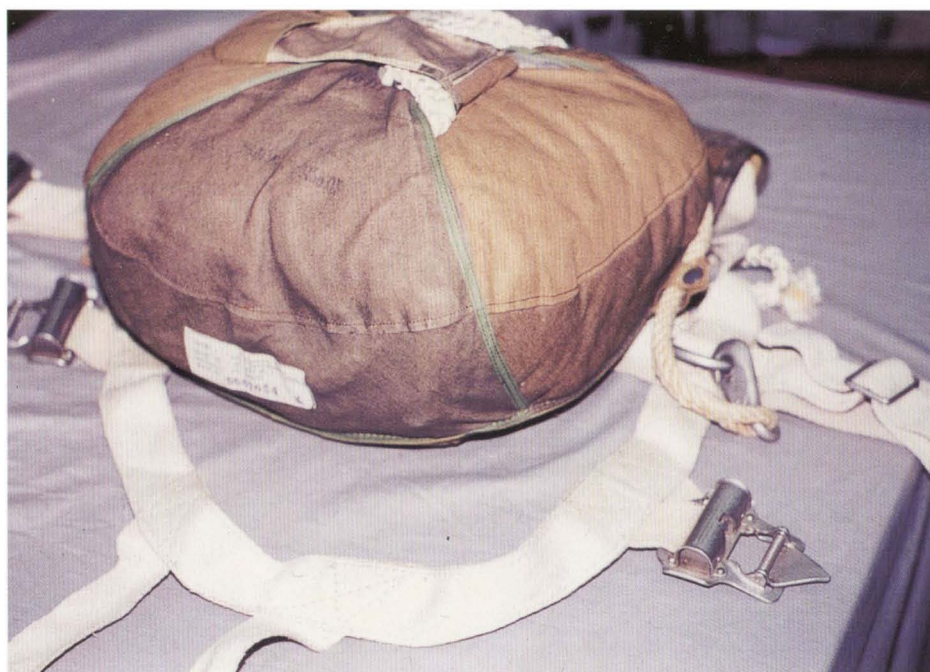


RZ 20 quick release housings are usually stamped steel.

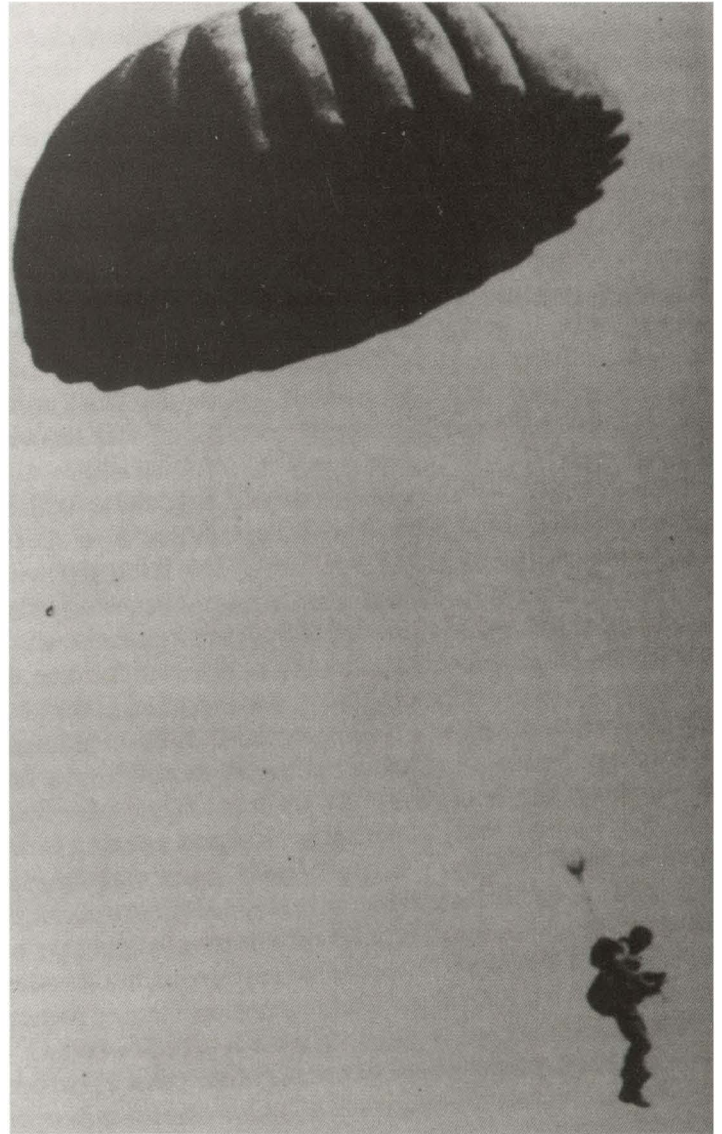


The RZ 20 will have four harness quick releases. The locking plunger barrels will usually be stamped metal but a variation here was milled out of solid aluminum.

Some RZ 20s will be marked within the container and on the outside on either side of the closure point "Ju 52" and He 111. The pack closing pin is secured by break thread to a small ring tacked onto the container. The closing pin has a drilled hole for this purpose.



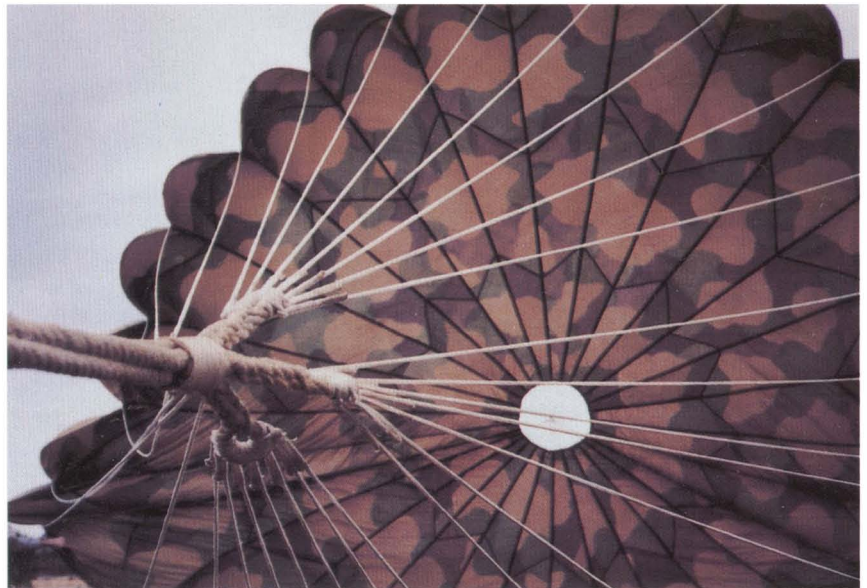
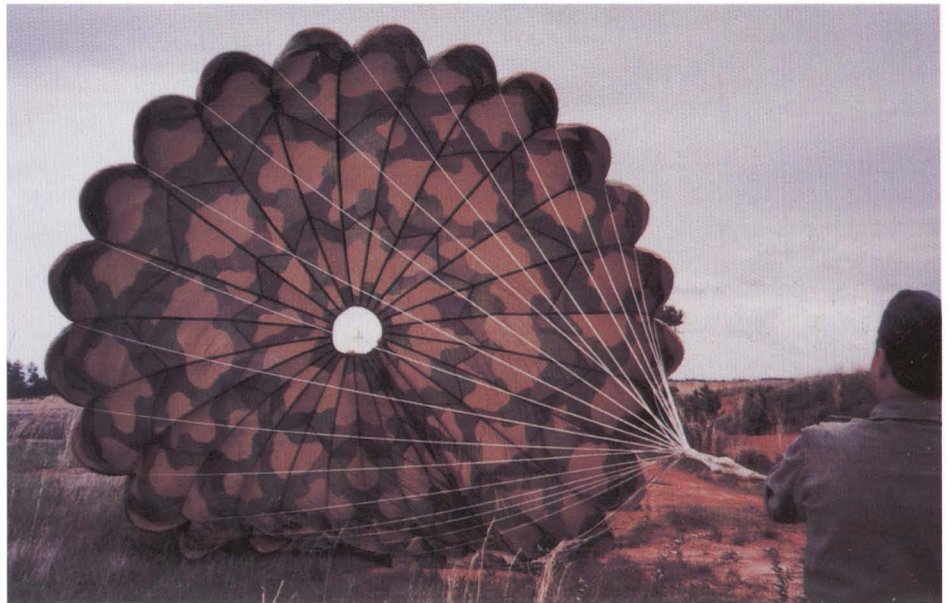
RZ 20 canopies will be dark in period photographs.



Jägers had to crouch to clear the door of a Ju 52 3m.

RZ 20

RZ 20 canopies were tri-color camouflage.





Textbook German exit – canopies fill below him and D-bags are up high flapping in the breeze. From a color wartime film.

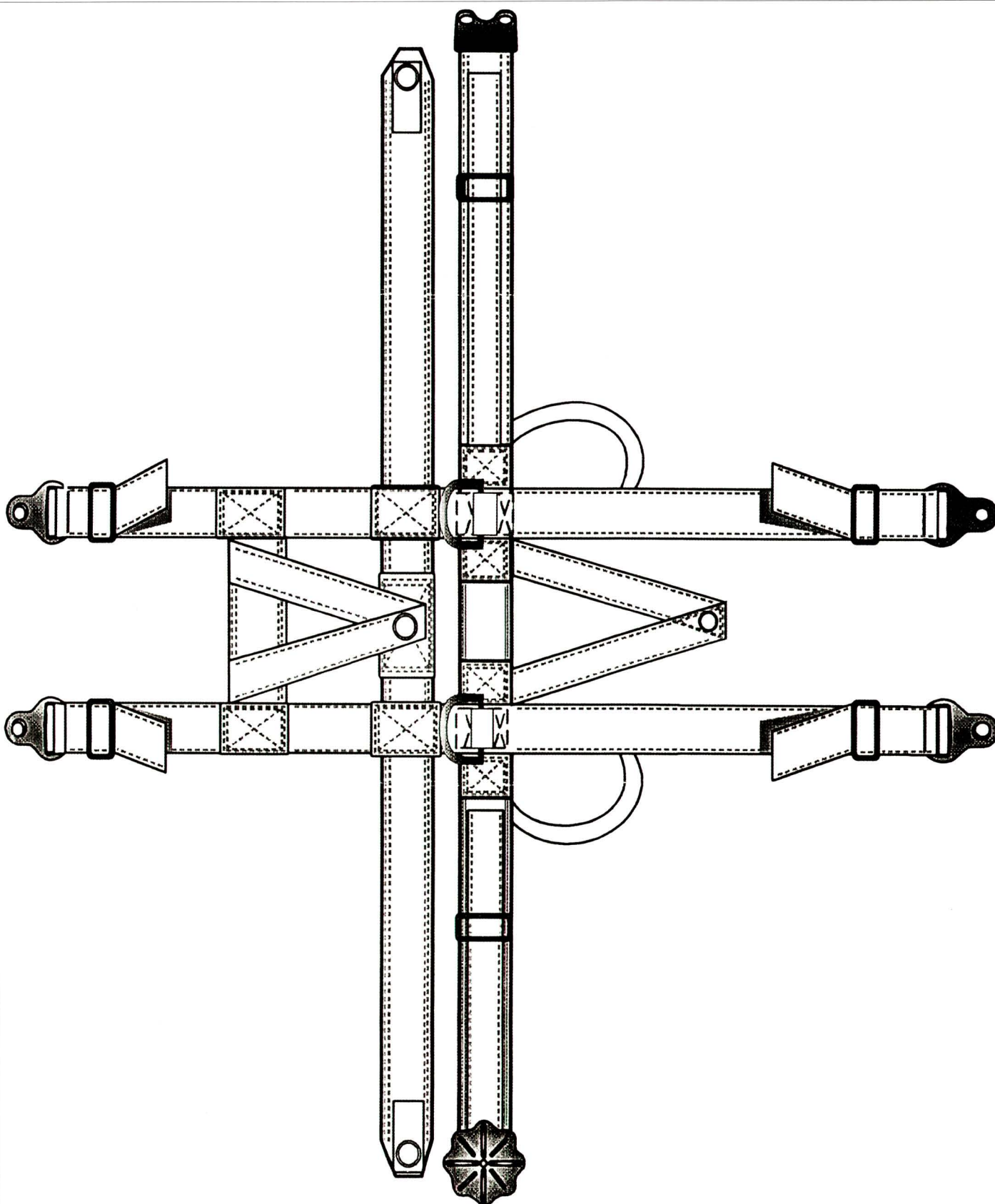


RZ 20 canopies inflate below as this German vaults into the sky. The square shape below his knee is a deployment bag.



- SINGLE POINT QUICK RELEASE BOX
- DEPLOYMENT BAG STOWS STATIC LINE
- HARNESS STRAPS SECURE DEPLOYMENT BAG
- CANOPY IS DELTA SHAPED





Schematic of RZ 36 harness – a unique design.



Quick release button in the secured position.



The packed RZ 36 is a small bundle.

The RZ 36 was the last of the series and was adopted in 1943. It had a tri-color (green-tan-black) camouflage or white canopy that was delta shaped when inflated. Greatly simplified, the container was reduced to bands that held the deployment bag in place. The harness has a single point quick release box and is essentially a complicated H built around a wide belly band. The suspension system had not changed.

The same twin risers from D-rings on the belly band converging to a point from which the suspension lines radiate to the canopy. One is again struck by the apparent flimsiness of the single web thickness of the harness. This parachute was not steerable, but it probably had a slight forward drive. The RZ 36 was designed for ease of manufacture and not for years of service.

The quick release box is affixed to the left side of the belly band instead of a chest strap. The leg and shoulder straps possess lugs that snap into the box over beveled edges of spring loaded plungers. The leg straps are properly routed through harness attached loops that spread the load across the thighs. The strap lugs have anti-chafe surfaces that are smooth steel clamps hidden under the webbing loop through the lug. The right side of the belly band is secured to the QR box by a thin double pierced plate that fits under the strap lugs on that side.

The canopy was composed of sheets of fabric sewn together to form an oval of sorts. These bands, numbering ten, are alternately 2'7" and 2'8" wide. The canopy planform is elliptical with a straight 22'4" leading edge and 13'4" trailing. The twenty suspension lines are 22'11" long. The suspension lines are sewn to and terminate at the skirt. White reinforcing tapes extend up from the S-line attachment points and delineate the gores. Packed up, the 36 is a smaller bundle than the RZ 20.

There is no apex vent but a short loop sewn at four points serves as a packing aid for tie down. (The RZ 36 was not the first delta shape parachute. The Hoffman Triangle was adopted by the U.S. Army Air Corps in 1932 as part of the A1 and S3 systems. It was steerable but expensive to make and was deleted in 1936.)²⁸

The D-bag also had on top the twin elastic-puckered pockets that stowed the static line like the RZ 20.

The bag is about 15" long, 13 1/2" wide and 3" deep and has seven line stow loops on one side and six on the other. The bag is closed by two flaps and secured by suspension line locking loops through conventional sewn grommets. The bottom of the bag is reinforced for attachment of the static line connecting loop, which consists of twin bands 1" wide installed by double V stitching. This point is protected by a 7 1/4" long flap (also 5 5/8" wide) that is closed by two button snaps.

The RZ 36 static line was, on one examined, 18'3" long, another was 20'1".

The RZ 36 harness had web extensions that held the D-bag in place on the jumpers back. The vertical bands are two that meet to form a V. These are joined by two horizontal bands that are separate from the load bearing belly band. The static line closing pin locks these straps by the same cloth loop that closes the container flap which actually is just a cover for the S-line stows. The deployment bag is the container and its retention to the harness is by these skeletal straps. The full extension of the static line withdraws the closing pin which frees and opens the D-bag at the same moment.

The harness quick release box dial is inscribed: *Gurt ablegen: drehen -> dann druecken*. The usual instructions, though in small letters. On the back, in small letters *Gerät Nr. 10-10-E-1* and a serial number.

The risers are 28" long from end of loop to their convergence, then are paired together for 7 1/2" measured to the ends of the four loops. The serving is 2 3/8" long. The risers are ropes sewed together with two small wraps. The left riser has a small stud fastener closed wrap pocket to store the packing data booklet "*Fallschirm Pruefschein*." The packing/inspection booklet is made of a coated blue cloth. (This booklet disclosed that the system studied had been examined on 15 January 1945 and the next inspection was due 15 January 1946. A bit optimistic in retrospect. It was last packed 21 January 1945.) The RZ 36 was produced as late as May 1945.

The RZ 36 was the system employed by von der Heydte's battalion during the Ardennes Offensive in December 1944. The commander, von der Heydte, did not descend with a Russian parachute.²⁹

²⁸ "The Parachute Manual" Dan Poynter Santa Barbara CA 1972 p.212

²⁹ conversation with Klaus J. Peters 24 Sept 1998 who knew von der Heydte personally and posed this specific question.



The deployment bag stows the static line conventionally on top.

The static line is routed around the bag retaining straps.

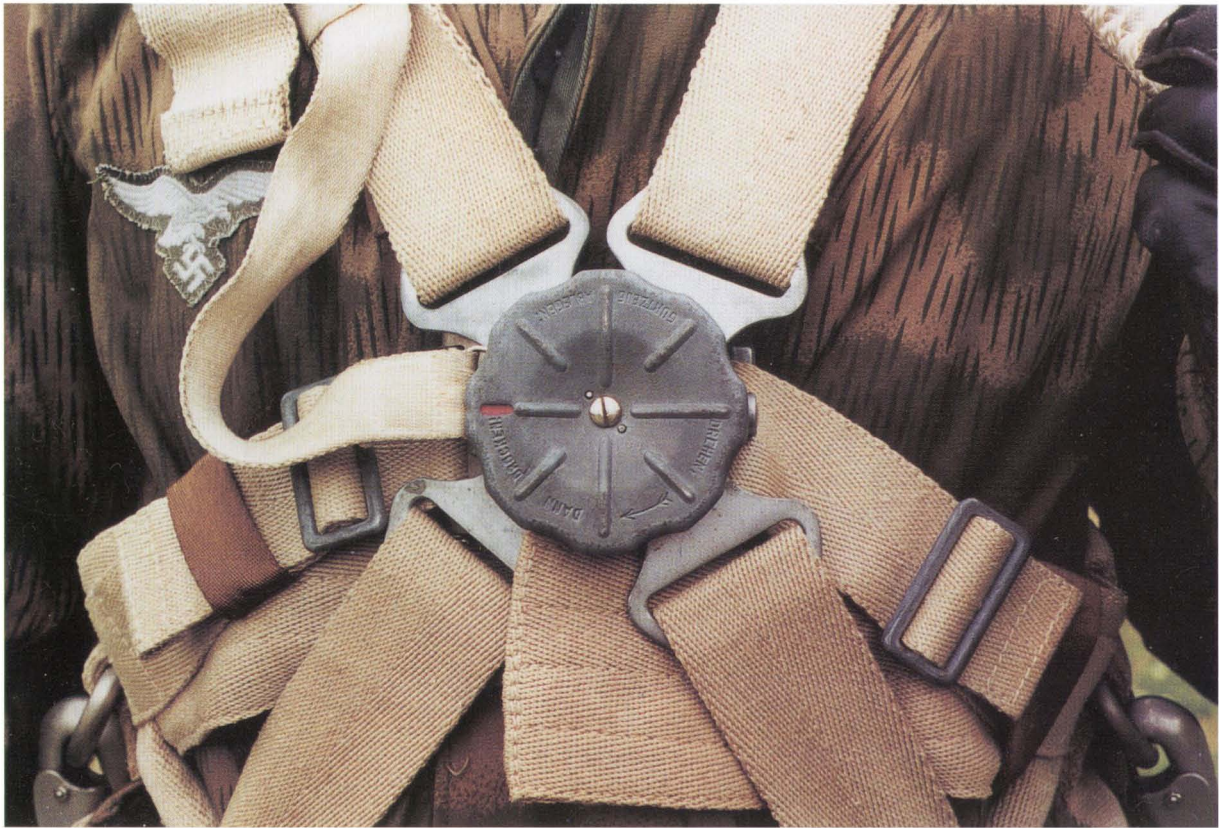
The closing pin releases the straps and the bag simultaneously.

The RZ 36 has plenty of adjustment for size as evidenced by the loose straps.

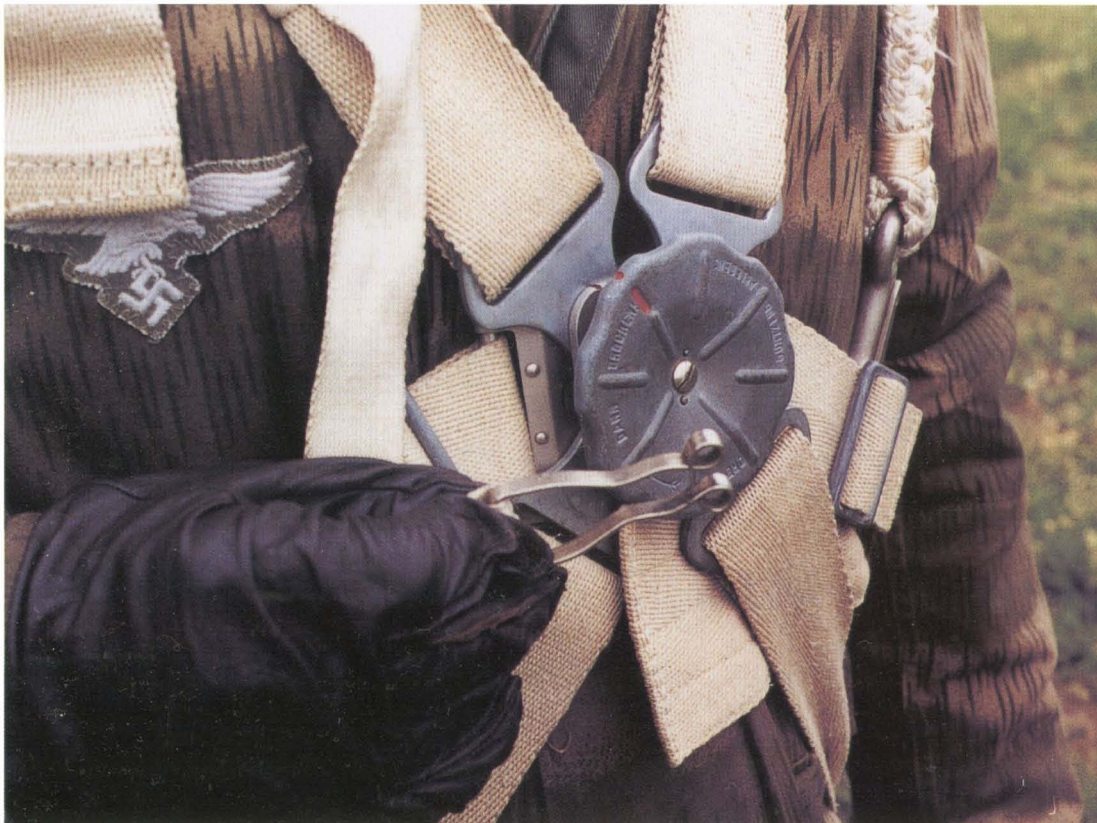


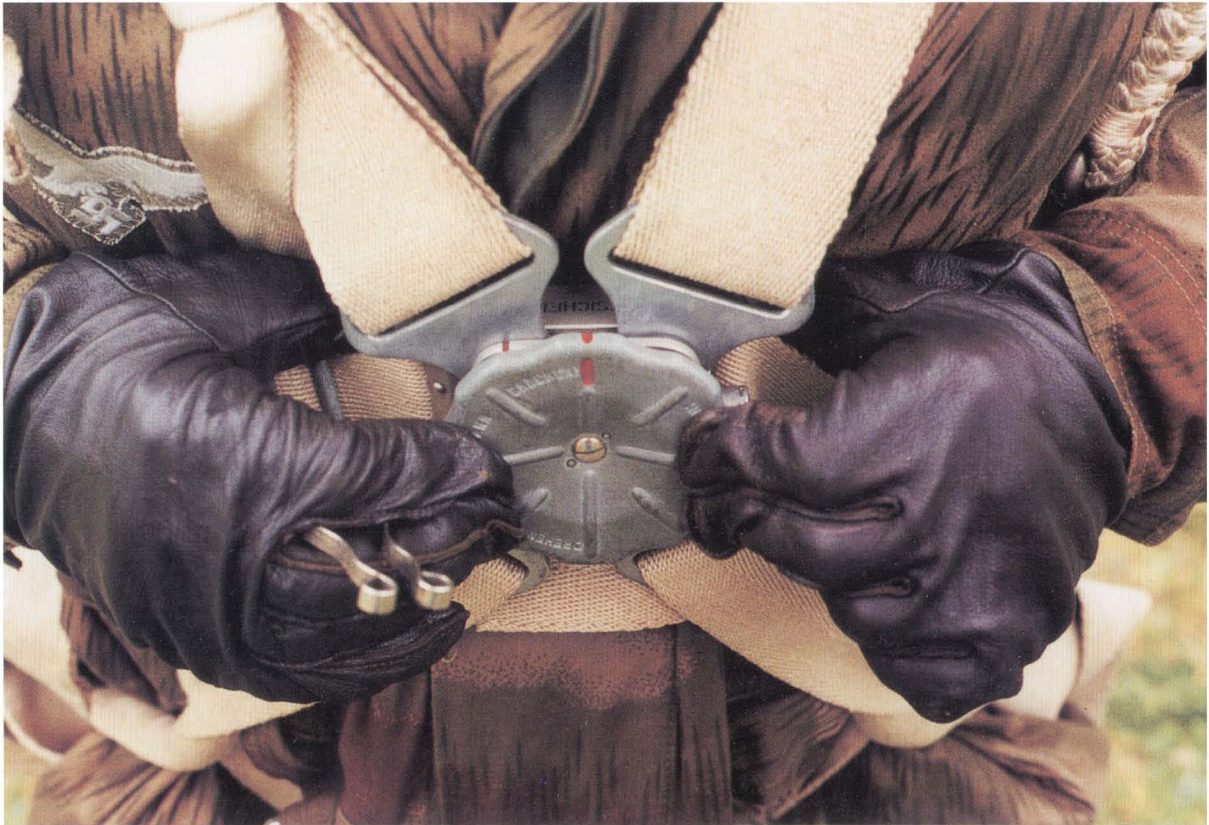


The RZ 36 harness suspended the jumper in the same manner as the earlier systems.



RZ 36 harness is identified by its single point quick release box. The release button has a mid point notch where the red mark indexes with a red line on the release base plate. The locking fork, an additional safety device, had to be pulled to depress the button.





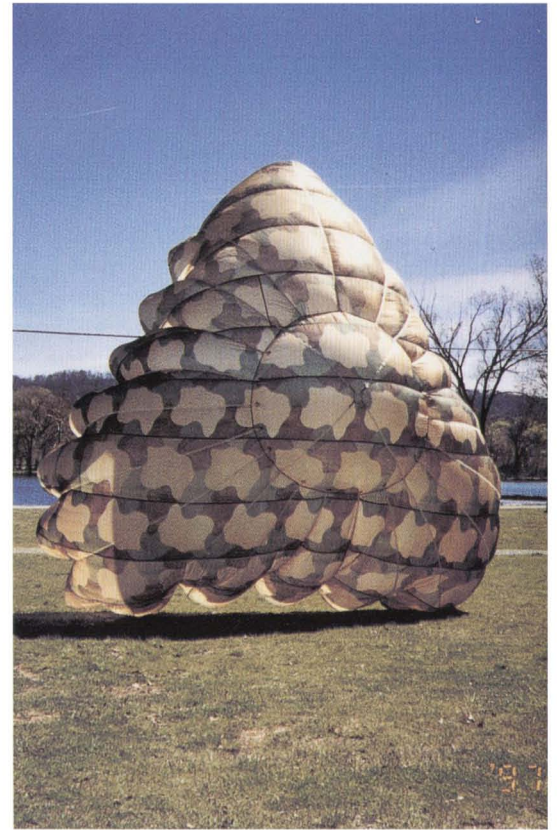
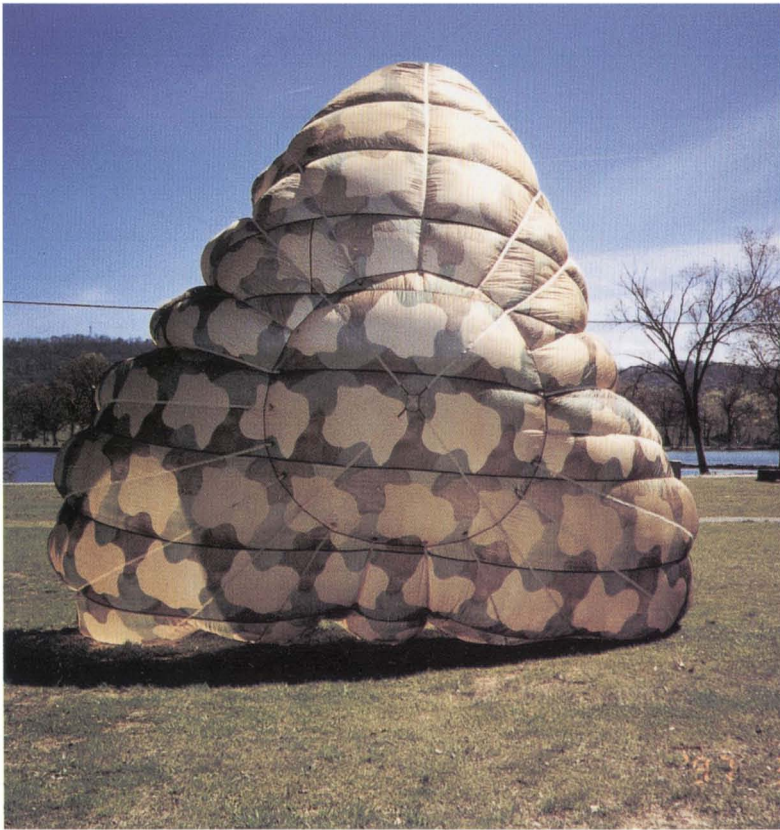
Single point quick release with locking fork.





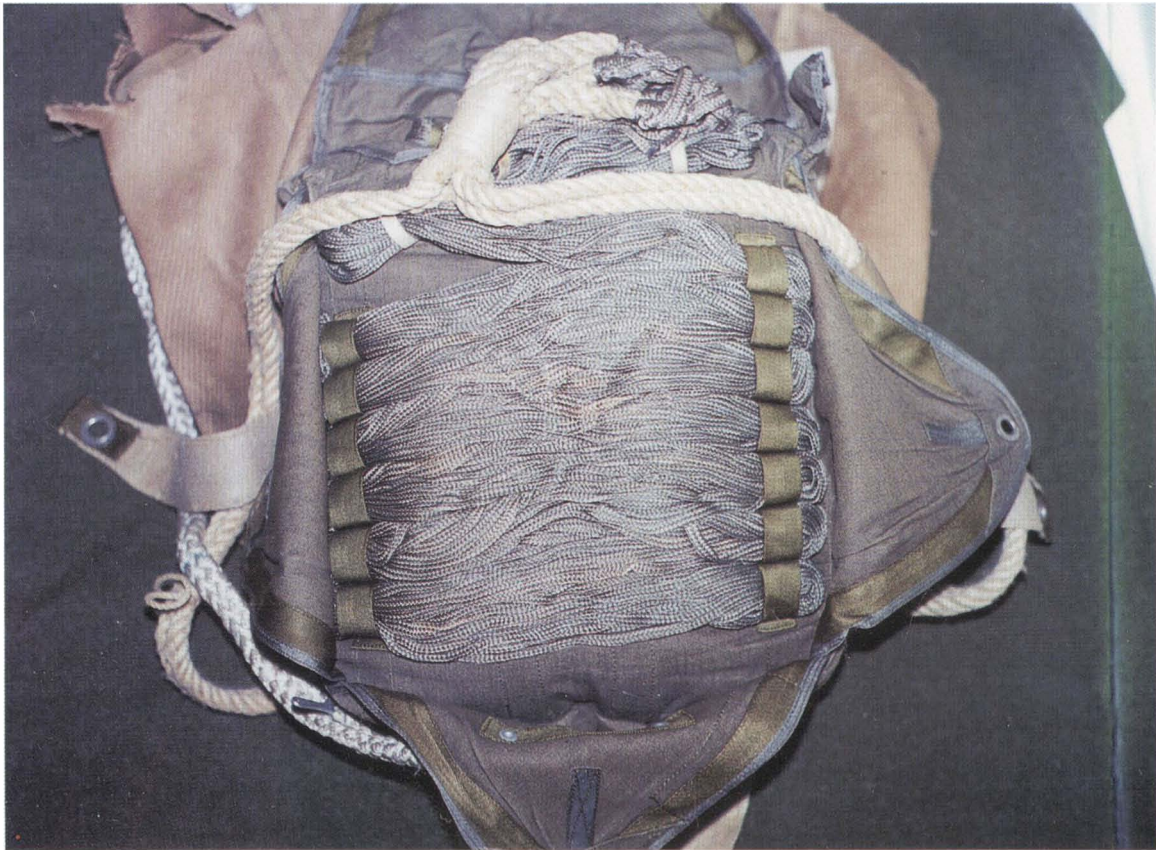
“ENTSICHERT” means released.

“GESICHERT” means secured.

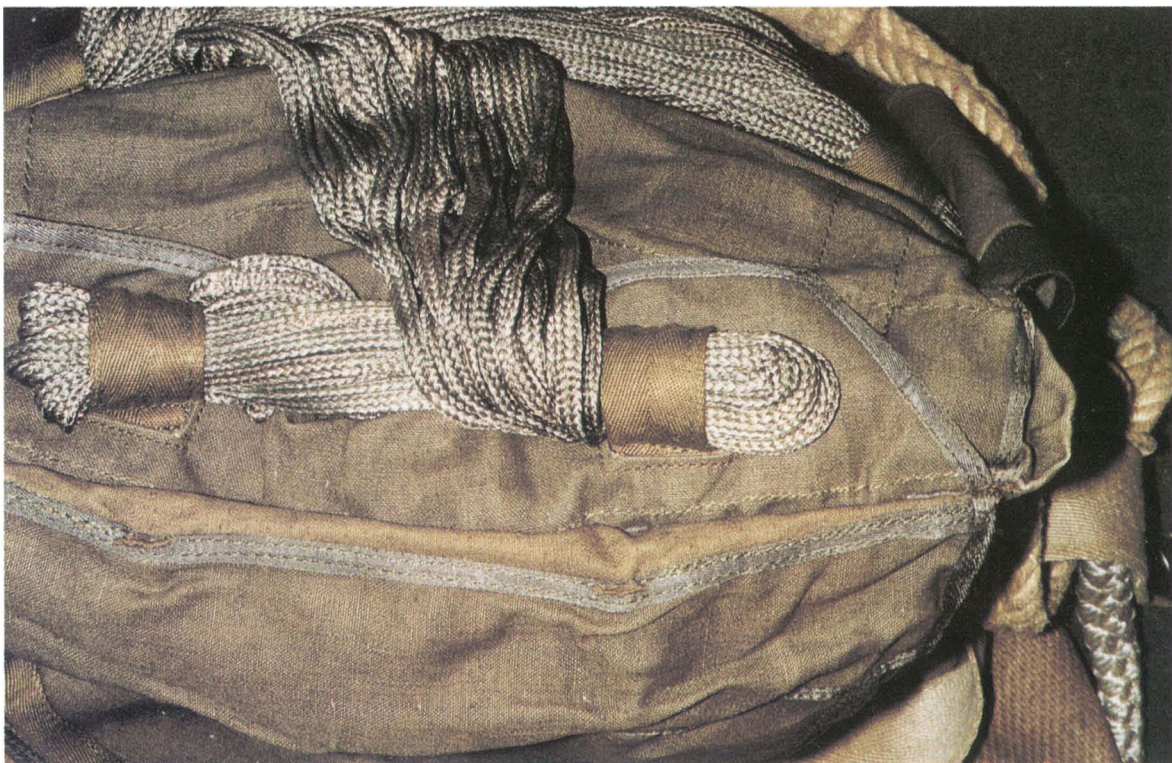


The RZ 36 canopy was delta shaped with a flat leading edge and the V-tail providing a vent thereby reducing oscillation.





The static line closing pin secures the bag to the harness and simultaneously keeps the bag closed. When withdrawn, the bag flaps are opened exposing the suspension lines for deployment.



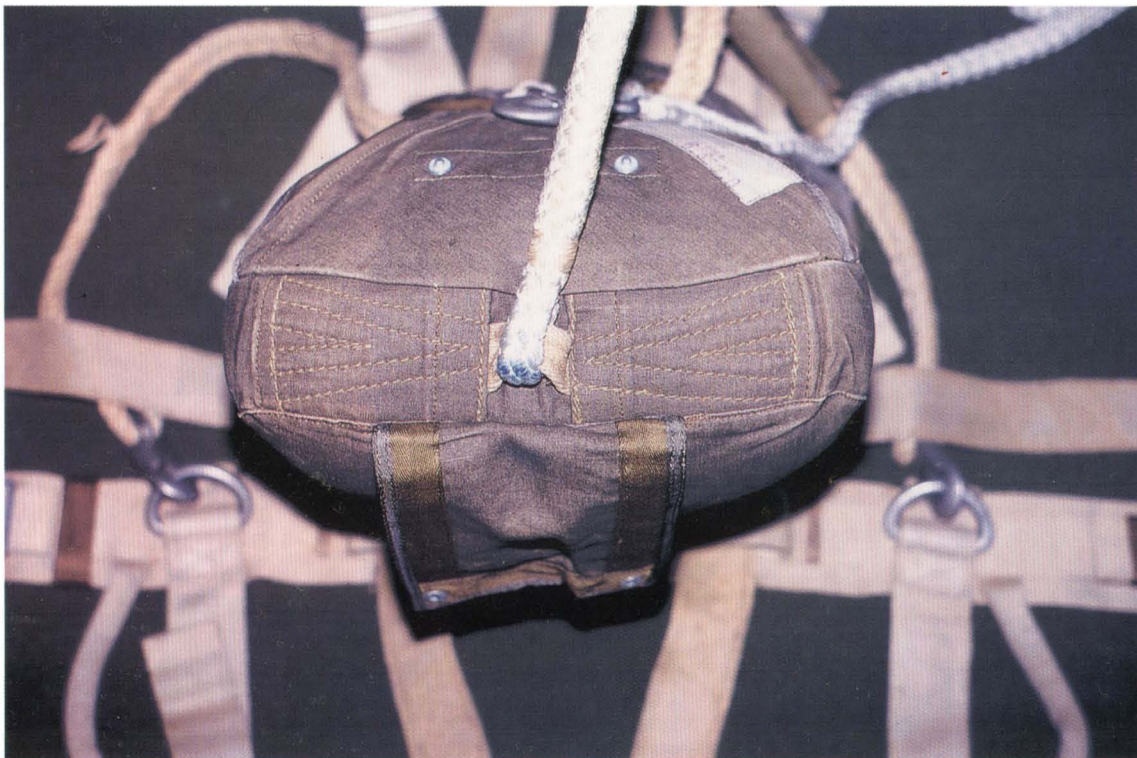
When the lines are fully deployed, a double closing flap is opened and the canopy will be pulled out.



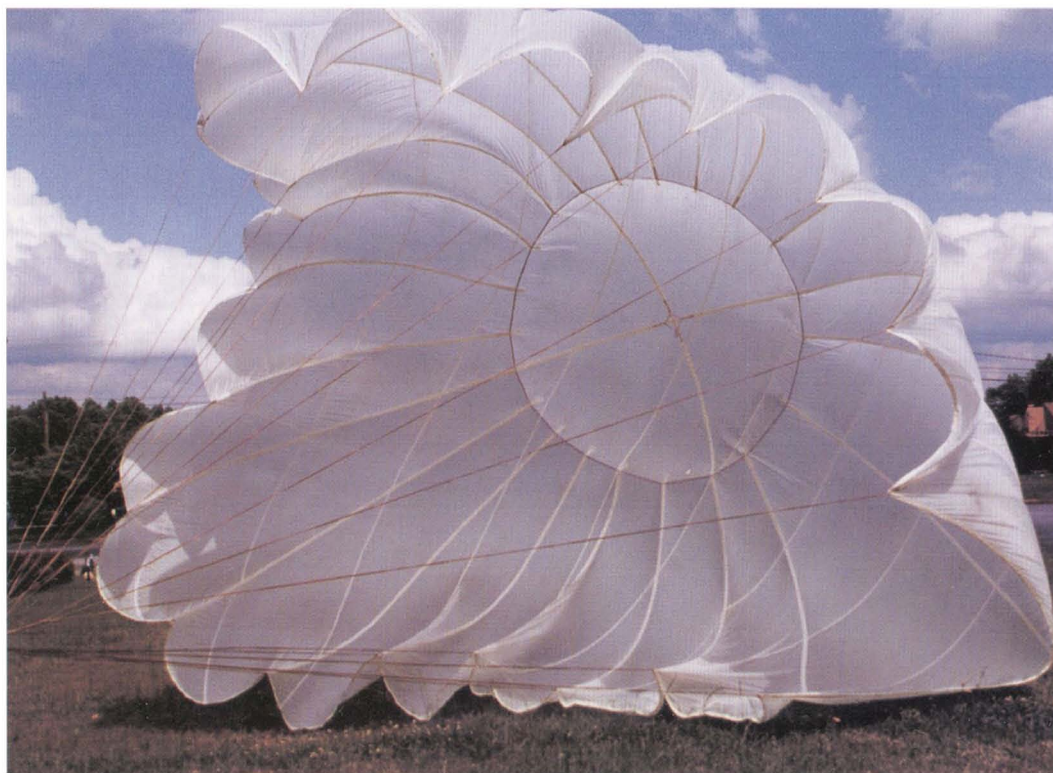
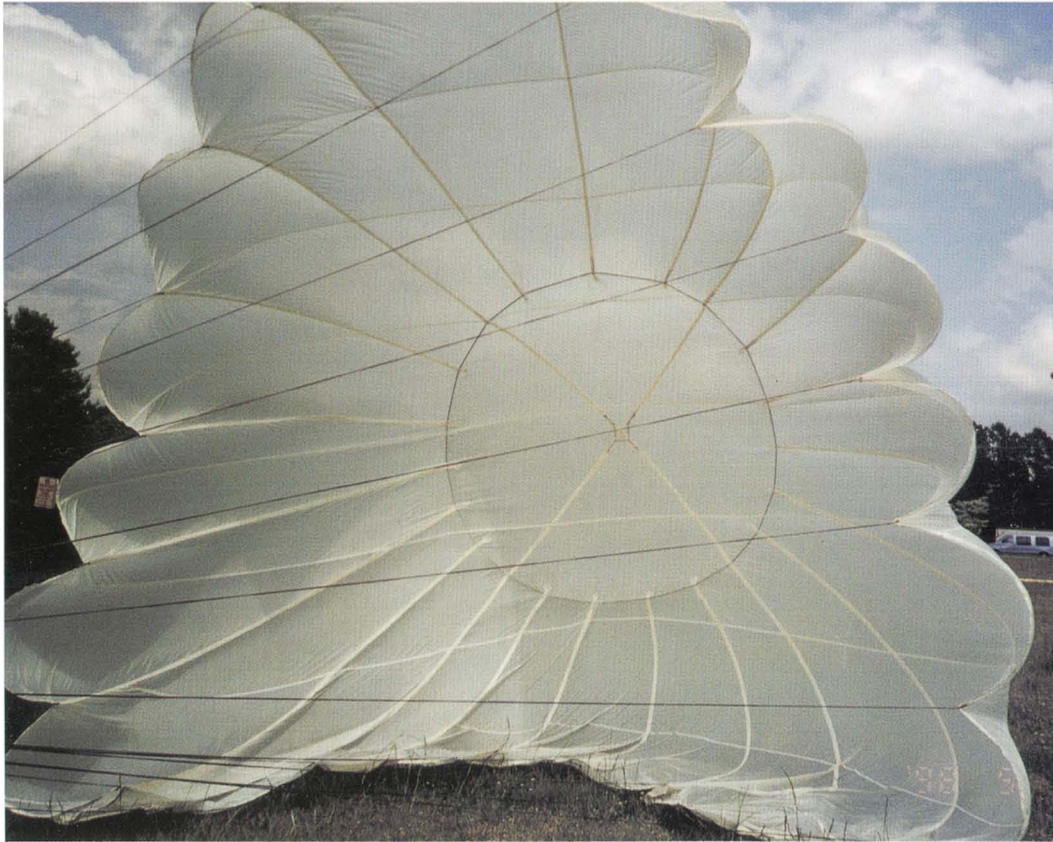
Closing arrangement for bag and straps on the RZ 36. Pull up cord in top photo shows routing.



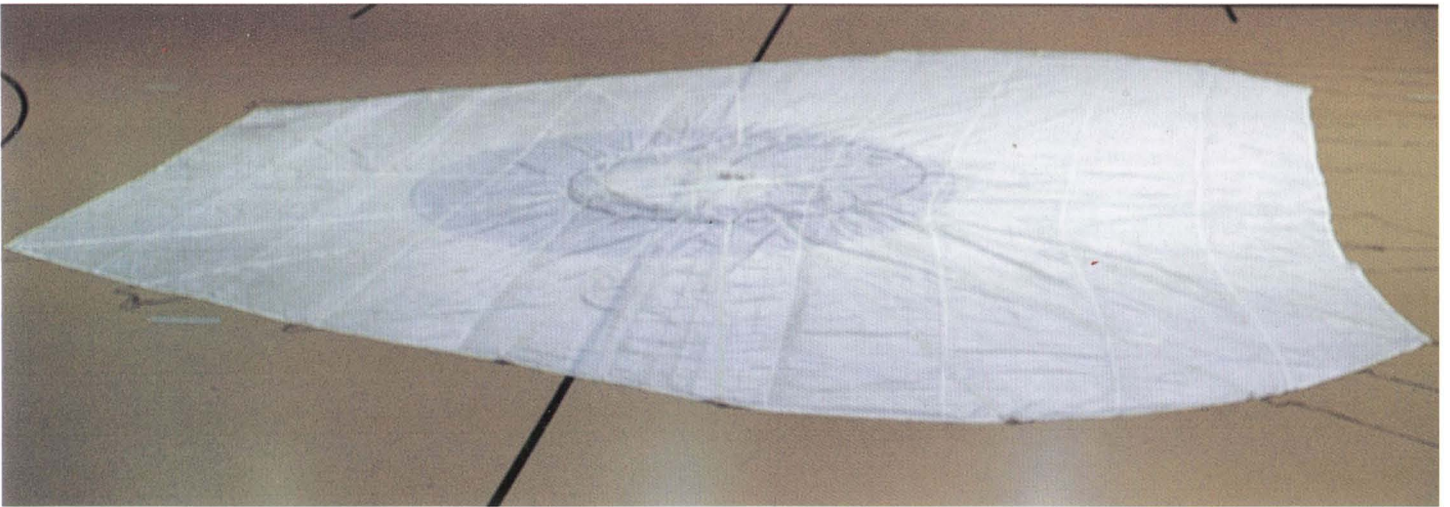
Suspension line attachment to RZ 36 at radial seam.



Static line connection to deployment bag on the RZ 36.



A white RZ 36 canopy partially inflated. The vented tail is on the lower right.



Laid out flat, the RZ 36 presents a strange elliptical pattern quite different from its inflated self.

There was an additional type that possessed features of the RZ 36 system with the flat circular RZ 20 canopy. Its D-bag had static line stow pockets proving that it was not an RZ 20.

It may have been an economy measure, that is to use stocks of round canopies on hand in the new RZ 36 harness model. However it might also represent a transitional type. The Germans did not provide much data in marking their canopies. Only one example of this unnamed type has so far been examined by this writer and it was incomplete.

German paras packed their own parachutes during training and before every operational jump. The (RZ 20) deployment bag can be placed in the container so that the risers come out of the top or the bottom. It does not make any functional difference.

In the packing process, the canopy is inspected, pleated, folded into longitudinal thirds then they gave the crown of the canopy a half twist – called “*leibknoten*” – to close off the apex vent and presumably cause the canopy to inflate faster. Drag parachutes (rounds) develop from the top, and as they scoop more air they then spread the canopy out from top to bottom. Whether or not the *leibknoten* really helped speed the process is debatable. What matters is that they felt it did and it made them feel better about it. The German paras jumped at really low altitudes 400-600'. Jump logs record that their first jump was from 250 meters, #2 was 200 meters and the last four in the school were from 150 meters.

There has been a long-lived rumor that the Germans dropped troops without parachutes somewhere-some-

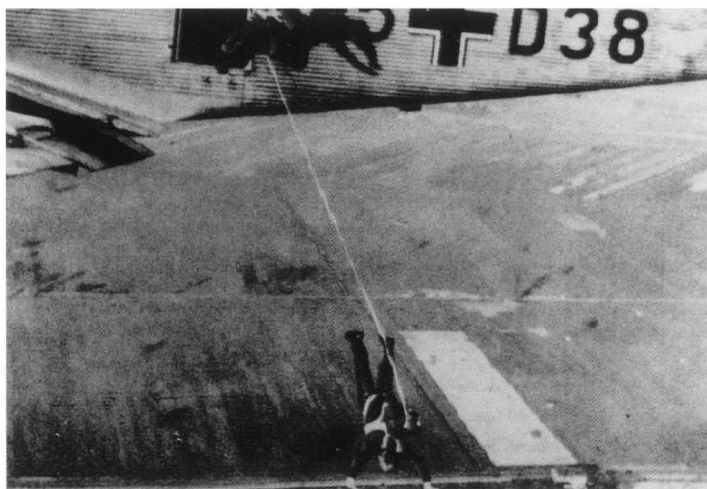
time during the war. There is no evidence to support it. They did drop Army Mountain troops in Norway after a short three jump (ten day)³⁰ training course. This explains the pictures of troops standing in the snow rolling up their parachutes wearing the standard M35 steel helmet³¹ with Army smocks having descended in RZ 1 rigs.³²

Many German paras did jump with their weapons on Crete. This was standard practice afterwards and training jumps were performed with wooden dummy guns. Discounting the Brandenburg Regiment (*Abwehr*) operations, there were eight more combat drops the *Fallschirmjäger*s made. Many photos exist showing *Jäger*s jumping without helmets. This was in the school environment, but no explanation is offered and this writer will not speculate why that practice was permitted.

Some RZ 20s will be marked within the container and on the outside on either side of the closure point Ju 52 and He 111. These markings are for riser placement and closing pin orientation for jumping the respective aircraft. The pack closing pin is inserted so that it is withdrawn from the bottom if one is to jump a Ju 52 and withdrawn from the top if one is exiting a He 111.

The pack closing pin is secured by break thread to a small ring tacked onto the container. The closing pin has a drilled hole for this purpose.

Parachutes were stored in a tan painted metal box that was 18 3/4" long, 11 3/4" wide and 16 1/2" tall. This can was labeled 'Weatherproof container for Personnel Parachute' so it may well have been used for aircrew types also.



³⁰ Nasse p.22 & 24

³¹ “Fallschirmjaeger” Feist & McGuirl p.34 also “Fallschirmjaeger in Action” Feist & Harms Squadron/Signal Carrollton TX 1973 p.13

³² Nasse p.23

Packing an RZ 20

This procedure is really quite simple and is included because in these litigious times few active riggers will be willing to risk the liability of packing your old rig no matter if you sign a "for display only" "No Jump" statement, duly notarized, witnessed, sealed with wax ad nauseum. Who can blame them?

Before you sell, lend, transfer, or trade an antique parachute, be sure to get a signed document from the recipient that he/they understand that this item is not air-worthy and will never be used to make a parachute jump from any height. Don't think there is no one stupid enough to try such a stunt. There are, and you must "CYA." Legally speaking.

This information is included so you may unpack, inspect, affect repairs to and repack your vintage parachute and display it so that it looks as authentic as possible.

You will need a space such as a clean floor 30-40' long and 6' wide. A riggers' packing table would be ideal. It helps to have assistance. You will need a strong point to tie the apex off to.

Tools: two one foot lengths of cord. One 3-4' length of cord. Guttered nylon suspension line works best. A temporary pack closing pin of steel with a smooth blunt end, smaller than the pin affixed to your rig's static line. An old ripcord works great, are common and are not in much demand any more.

Inspect the container closing loop carefully for fraying. This is the piece most likely to fail especially during closing. It is made of cotton and a replacement is easy to fabricate. If it is already half frayed through, contact a rigger who will replace it for you. This simple operation does not in any way place a rigger in legal jeopardy.

Gently pull the closing pin and pull the D-bag from the container. Unstow the suspension lines from the D-bag stow loops. Note that the container and D-bag are made of flimsy materials and as they are over fifty years old, cannot endure rough handling.

1.) Lay the canopy out and stretch the lines. Now straighten the apex by pulling the upper lateral band so that it is not canted.

2.) Tie the apex down. Have your helper pull back on the S-line convergence. This makes the S-lines taut ("pulling tension") and makes the next step a lot easier.

Now if the lines are snarled, and they just might be, there are two ways to proceed in untangling. First, detach the canopy from the harness by removing the pins and unsnapping.

The easy (and I admit) fun way is to take the canopy out with two friends to a clear field on a windy day (10-15 kts steady) and inflate the brolly. It won't hurt the artifact and clearing the tangles is easy because you can see where to pass the lines through.

The tedious way is to pass the lines through the knots unstretched on the floor. It can be done, just takes longer. Anyway, the correct picture will have all twenty-eight radiating in sequence from the serving (wrap) to the skirt.

3.) Go to the canopy, find gore No. 1. The next gore will be 28. This is the back of the canopy, the front will be numbers 14 and 15.

4.) Scoop up the center of these lines. Drop all but these four. Take the front line on your side, run it forward and around all the other lines and pull up that gore all the way to the apex. Look at each gore as you come to it. This is the inspection process. Look for obvious holes, tears, damage. You may note any faults and record them e.g. '3" tear gore 17 panel B.'

5.) Pull up the next gore by its line and flip that gore fabric over the preceding gore. This procedure is called pleating (also "flaking"). Proceed until the last line is in your hand. Hold this line aloft and look inside the pleated canopy. Ideally you should see little fabric poking through the stretched lines. There will be, so with one hand pull back on the effected gore to clear this wind channel or spread the lines a bit and the material will drop. What you want to see up the wind channel is a tight cluster of S-lines running up to the apex.

No one will be jumping this rig, but a neat pack job is easier to close, looks better and probably helps the ensemble to last longer.

6.) Lay the flaked canopy down. It should look like a right triangle with the lines running up the straight edge side .

7.) Count off fourteen gores to halve the canopy and lay out. The canopy now looks like an isosceles triangle.

Now gently dress up the whole by pulling out fabric to even the picture. Don't worry about the top 1/3.

8.) Fold the gores over into canopy thirds. It really helps to have some weights to hold the springy material down. Riggers use shot bags for this purpose and they are ideal.

9.) Stuff the apex into the top right corner of the D-bag (stow loops up). S-fold the canopy into the bag, until all the fabric is inside. Punch the bag to force the fabric to completely fill the space evenly. German practice was to fold the canopy in short accordion folds apex-to-skirt stuffing the canopy into the bag.³³ Either way, *das macht nicht*.

10.) Pull the closing flap up over the bag mouth.

11.) The two cord lengths can be used to make line stows and are in lieu of S-line packing hooks. Pull the S-line up in a bight – one should be sitting behind the bag, if you don't have a proper table – and pass the pull cord around the S-line bight with the running ends through the D-bag S-line stow loop. So that this stow locks the closing flap. Repeat on the other side. The D-bag closing flap now seals the mouth of the D-bag.

12.) Ensure that the S-line stows extend no more than 1" past the bag loop. Repeat this process until almost all the lines are stowed. Try not to "milk" the lines. Pull each succeeding bight over the loop to be used and this will make the stows uniform. Remove stowing cords you've used for hooks.

13.) Lift up filled D-bag and place lines down in container. The risers can be so placed that they come out at the top or bottom, it makes no difference.

14.) The snap buttoned loop on the closing flap is for securing the suspension lines. The long cord is for closing the container. Route it through the container loop and pass it through the opposing flap grommet. This is what will stress the container loop and the time when it

will likely break. Pull on the cord until the closing loop passes up through the grommet, then capture it with a temporary pin. Now run it through the bottom flap grommet and repeat.

15.) Punch the pack to move the material around. Pass the cord through the final grommet, pull the temp pin only when you are close to coaxing the loop through the grommet. Now replace the temp. pin with the static line pin.

16.) Remove the pull-up cord only after the S/L pin has securely closed the container. Run it around the bottom of the pin and slowly pull it free to avoid abrading the closing loop.

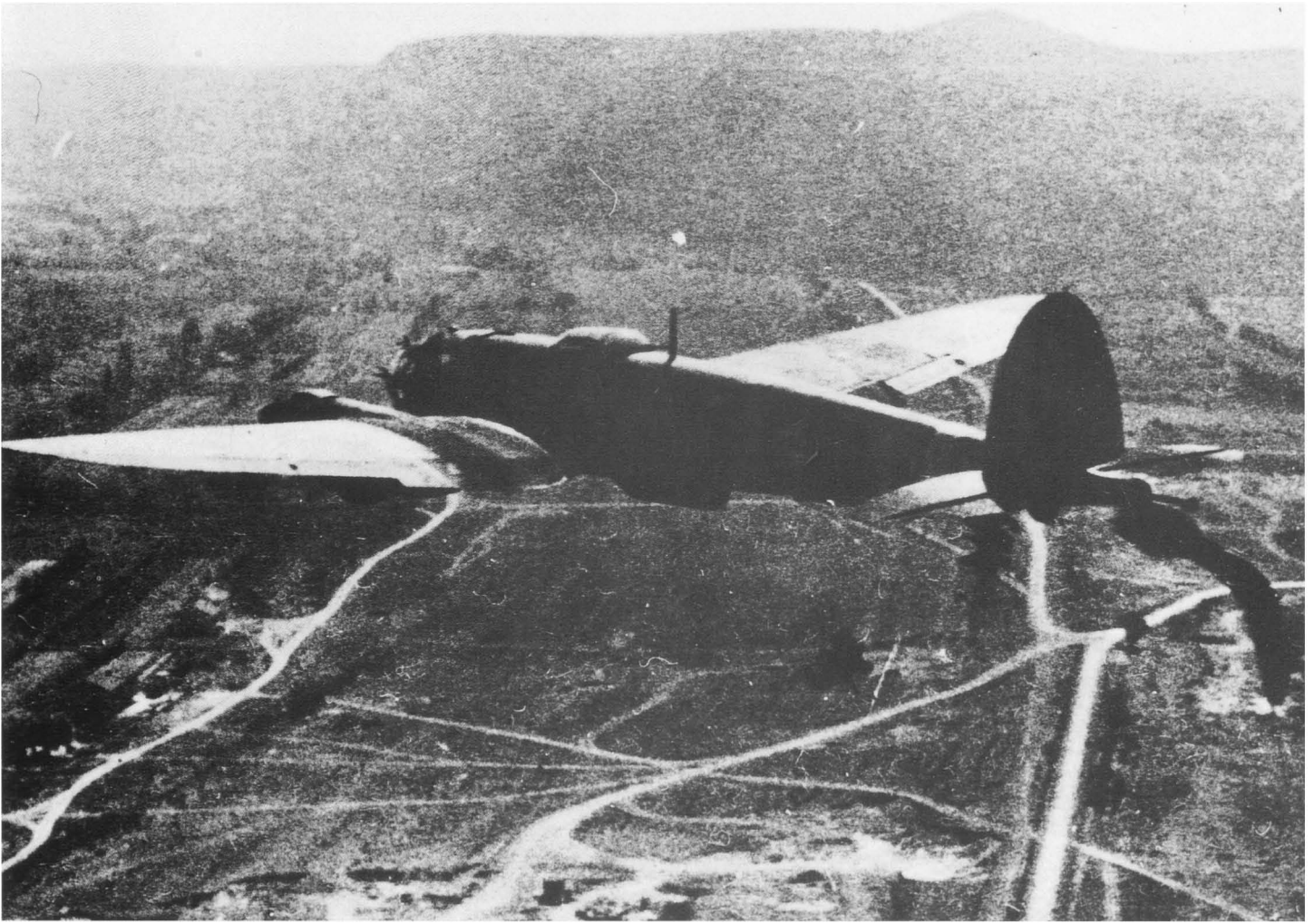
17.) Stow the static line by S-folds under the pucker pockets on top of the container. Done!

Noch einmal, this information is to be used to render the old parachute ready for display purposes only. No one should contemplate jumping a fifty plus year old parachute under any conceivable circumstances. It is a relic that might be destroyed in the attempt. There is also no safe, legal way to attach a reserve to the RZ 20, and one need only compare the flimsy RZ harness with one that is truly air worthy.

A parachute can be washed in the same manner as clothes with the same soaps. You should hand wash it, rinse thoroughly and hang to dry inside. Sunlight is the enemy of your parachute. UV radiation degrades fabric. Oils, solvents, and other chemicals may attack or stain the fabric as well. Store in a cool, dry place.

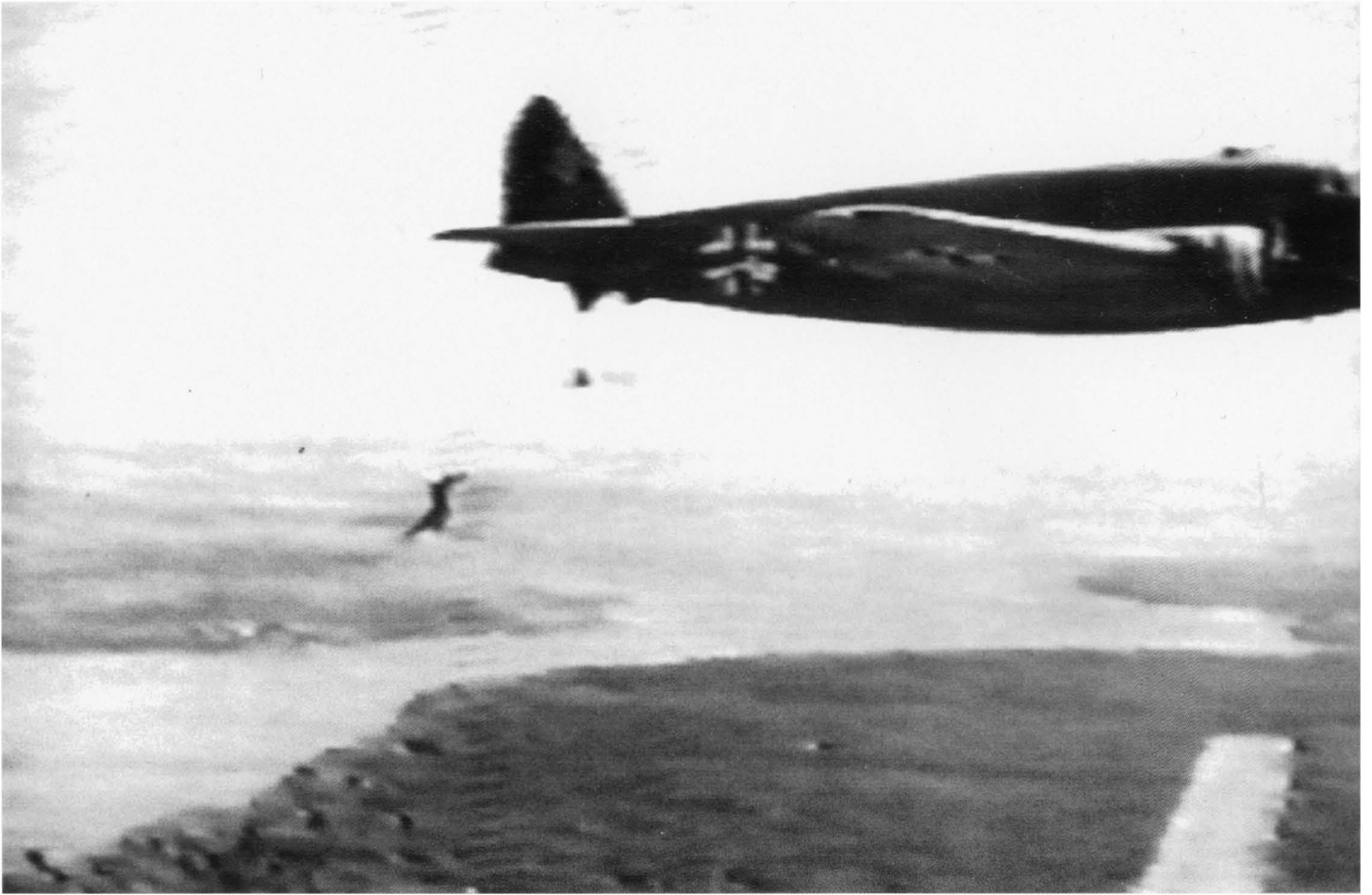
The canopy fabric will be fluffed after a washing. It will seem to have expanded. Packing will be a harder chore and may impose more strain on the D-bag and container.

³³ Brian Davis "German Parachute Forces" p.17 also
Klaus J. Peters "Fallschirmjaeger Reg't 3" R.James Bender Pub.
San Jose CA 1992 p.73-74



The Heinkel He 111 was often employed as Para transport. Black streak behind rudder is canopy stretching out. D-bags are stacked under the tail cone. The figure of a jumper is below the left horizontal stabilizer.

Deutsche Fallschirmjäger



German paratroops jumping the excellent SM 82 “Marsupiale.”

GLOSSARY

Scheitel = apex
Kappe = canopy
Fangleinen = suspension lines
Tragetaue = risers
Gurtzeug = harness
Bahnen = gores
Klemmschnalle = friction adapter (pinch buckle)
Sollbruchstellen = break cord points
Langsnaht = long seam
Quernaht = diagonal seam
Packhülle = container
Innere Packhülle = deployment bag
Aufziehleine = static line
Sicherungsstift = closing pin
Befestigung der Aufziehleine = attaching point of static line



German parachute soldier. Note sub-machine-gun, folding bicycle, portable radio.

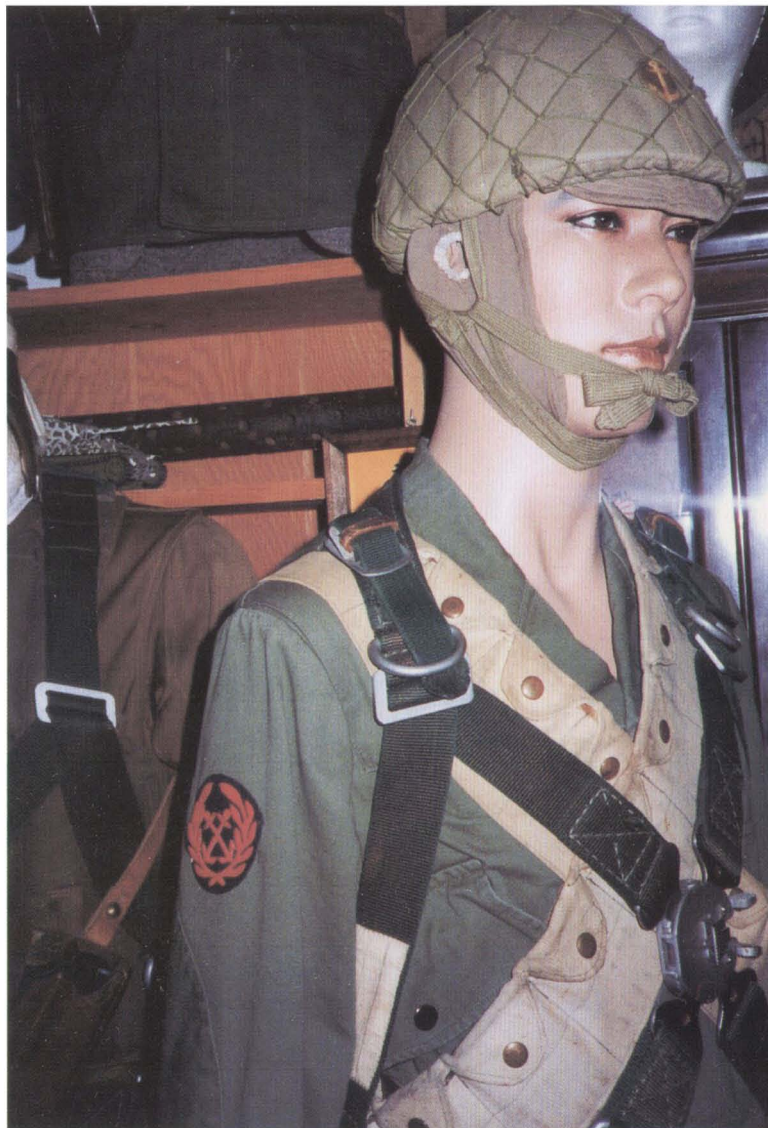
Fanciful British exaggeration of the Fallschirmjäger threat. One of the severe weaknesses of the German equipment and consequent doctrine was an inability of the individual to carry much weight. They were compelled to improvise by holding rifles and SMGs in their hands. This appears to have been a personal choice at Crete, but universally practiced afterward. The penalty for the load increase was a higher rate of landing injuries. They also hand carried ammo cans until just before crashing and free dropped them. They relied heavily on containers for weaponry that properly belongs on the troopers.



Japanese Naval Paratrooper in full jump uniform.



**Japanese Naval Paratroops descending onto
Menado, Celebes 11 January 1942.**



Japan

The Japanese Army and Navy were as separate as two services can be and still represent the same nation. They differed in everything from factories to grand strategy, so when they both entered the business of building airborne forces, naturally they were separate.

The Navy troop parachute has a dark green harness and container with gold trim. The container has a rigid pack tray that is a cloth covered steel pan with a comfort pad on the harness side. The pan and container are contoured in a slight oval shape with the bottom being 12" wide and 10" wide at the top. The pan is 18" long.

The harness is fashioned of a single thickness of silk web which one source claims has 3000 lb. tensile strength. Load suspension is from a point behind and just below the jumpers' neck where all the suspension lines terminate in a loop that is affixed to a large D-ring. This D-ring has a removable bolt, so the canopy can be removed from the system for repair/replacement. A key-like tool is provided for this purpose.

The canopy is made of silk and is 25'10" in diameter with 22'9" suspension lines measured from the canopy skirt to the top of the loop's serving. The canopy apex is 12" in diameter and is reinforced by two bungee cords.

The Navy harness has two high mounted D-rings that appear to be attachment points for a chest reserve. No reserve was provided, a canvas zippered weapons bag was connected to those points for a Type 100 takedown submachine gun or a 50mm grenade launcher (the misnamed "knee mortar").

The harness has a single point quick release of native design. It was permanently attached to the right chest strap. The other three straps had perforated locking lugs that snapped into it, the lug holes fitting over beveled plungers. The top plate was hinged and opened to a limited angle to accept or discharge the lugs. The hinged plate was released by pinching two spring powered tabs that in turn were secured by a hinged gate.

The leg straps were properly routed through harness mounted square shaped rings that spread the weight and opening stress out across the thighs. The three free strap lugs each have a painted red dot indicating proper polarity for insertion into the release box. This quick release seems to have been a standard feature on pilot escape types and was also incorporated into the Army troop parachute.

The Navy canopy is silk, bias constructed, twenty-four gores of four panels each with a 12" apex. The suspension lines are 22'9" from skirt to the top of the gathering serving. This canopy is bag deployed. The bag is contoured to fit the pack tray pan and is 17" long, 6" wide at the top and 15" wide at the bottom.

The suspension lines are stowed under bungee loops on top of the bag vertically, that is parallel to the run of the static line. The bag mouth flap covering the packed canopy is short – just enough to seal the bag and is secured by three bungee loops that are passed through corresponding bungee loops on top and locked by S-line bights.

The static line is 14'5" long from the base of the snap hook to the top of the D-bag. A branch off the S-line 9'2" from the snap hook holds a 3 1/2" cable to which the pack closing pin is fixed. This pin is wire wrapped and soldered to the cable which was the common technique before cold-flow swaging supplanted it. The static line actually pulls a short ripcord. A 37" extension within the bag terminates in a loop to which a break cord is tied to the canopy apex. A visual, non-destructive examination cannot measure breaking strain, but this writer estimates that the tensile strength of the original examined to be not much more than 50lbs. Anyway, it was two turns of string.

The closing pin keeps the container closed by locking a cloth loop which is run through the brass grommets of the five container flaps. This method is identical to the pack closing found in some modern sport parachute rigs.

³⁴ Bragg & Turner p.92

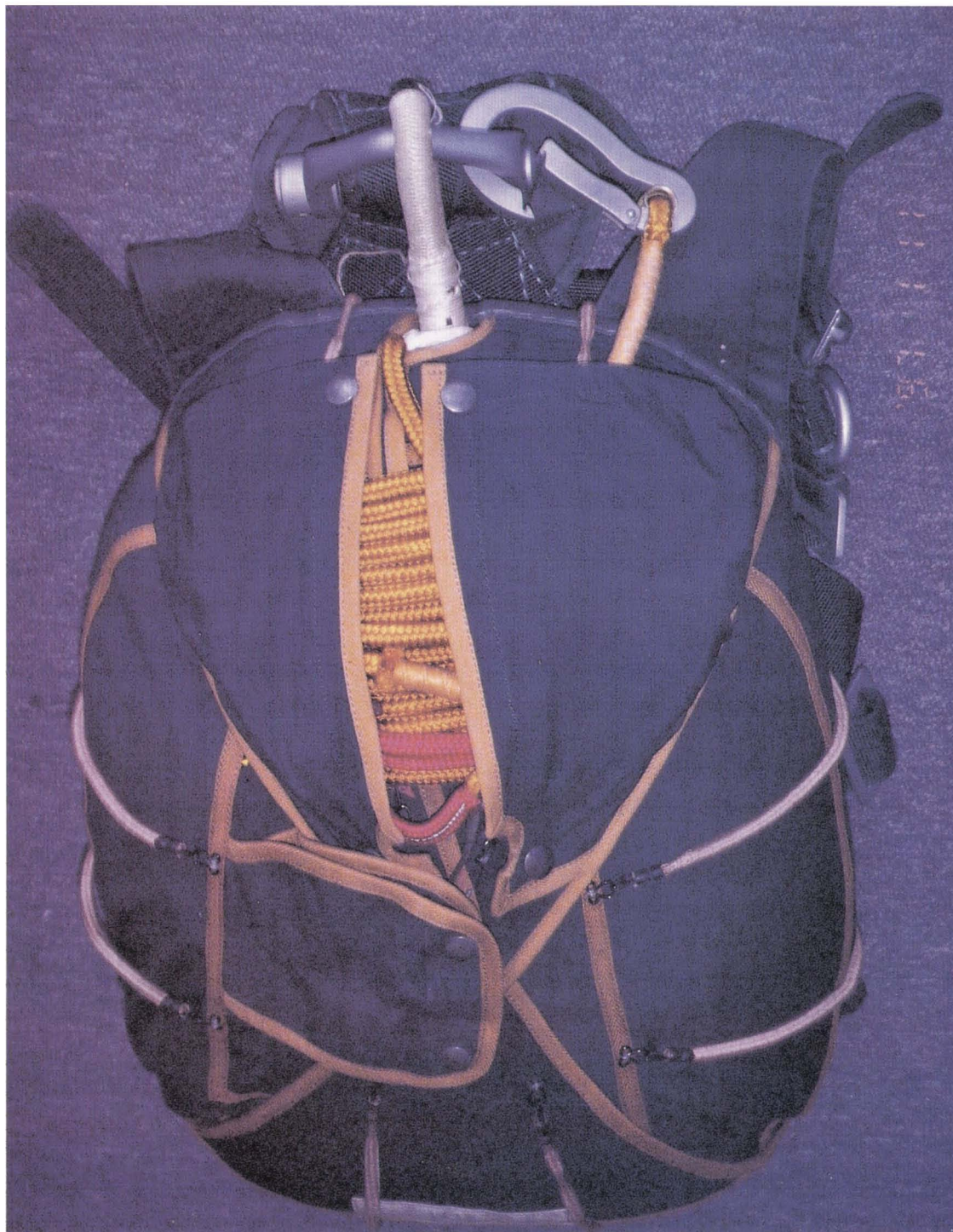
³⁵ conversation with Japanese insignia authority John Egger

A jumper under the deployed Naval troop parachute could reach up, gather some lines and steer the canopy in a slip maneuver. It is unclear whether this technique was taught or practiced.

The Imperial Navy formed two small units – the 1st and 3rd Yokosuka Special Landing Brigades. They conducted one airborne operation (11 January 1942) at

Menado, Celebes to seize an airfield with three company sized elements. On the following day a reinforcing company was dropped.³⁴

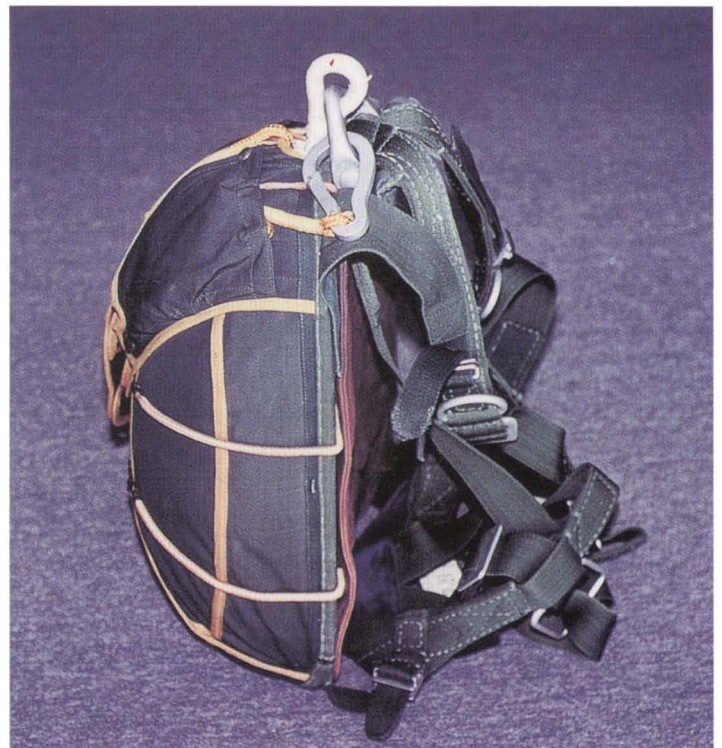
The Navy had no qualification badge, unit patch or distinguishing insignia. The circular patch with crossed parachutes, anchor and chrysanthemum is most likely proposed insignia, but not adopted.³⁵



The Japanese Naval Troop parachute is a dark green silk oval in which the suspension lines are joined to a single D-ring behind the jumper's neck.



Naval Troop Parachute in packed condition.



Naval hardware will feature a small anchor emblem.

Japanese Navy

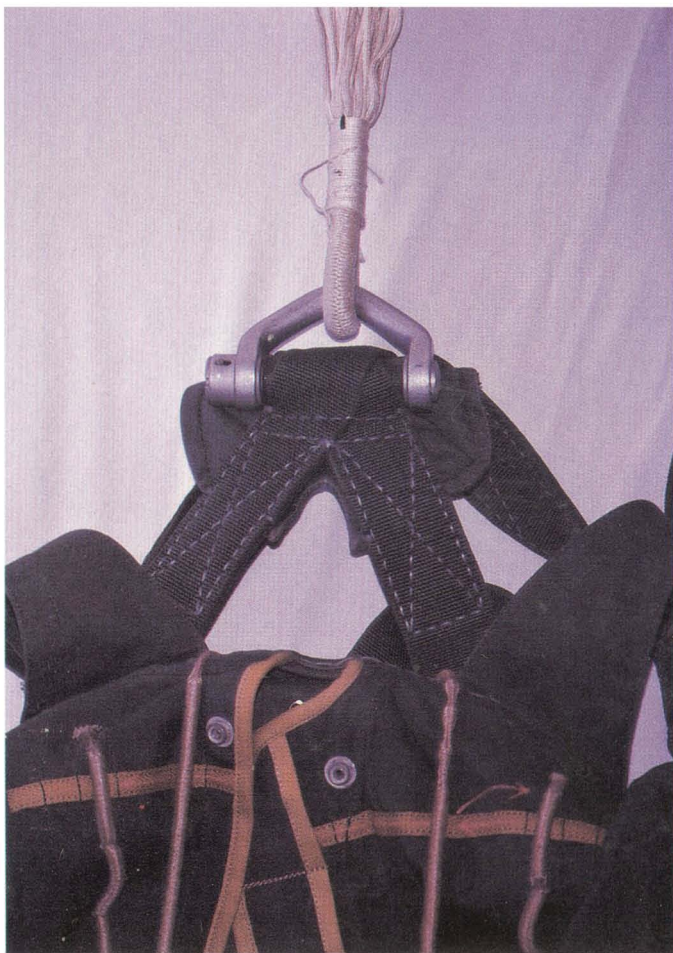


The quick release box is closed and locked. The system design is curious, but the workmanship is superb.

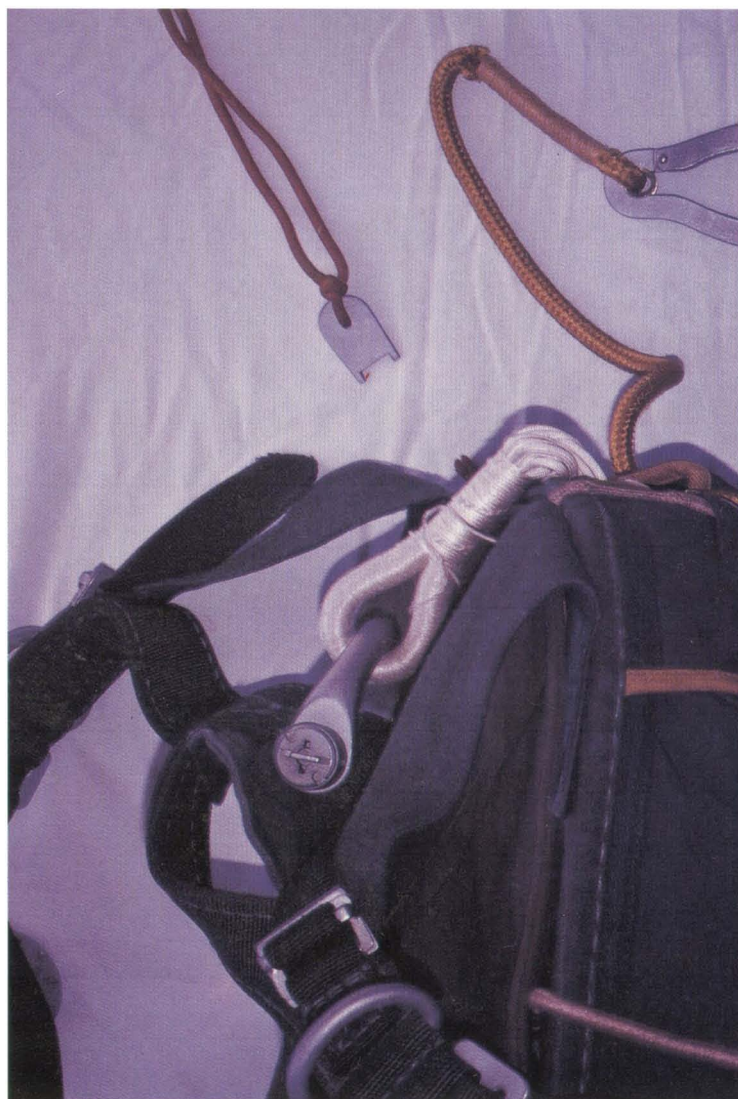


Leg straps are routed through the square harness rings. The pack tray is provided with a comfort pad seen here as a brown quilt behind the webbing.

Japanese Navy



The only objectionable feature is the placement of this suspension D-ring – at the nape of the neck.



The suspension lines form a loop secured to this massive D-ring. Shown also is the key for removing the attaching bolt.

Japanese Navy

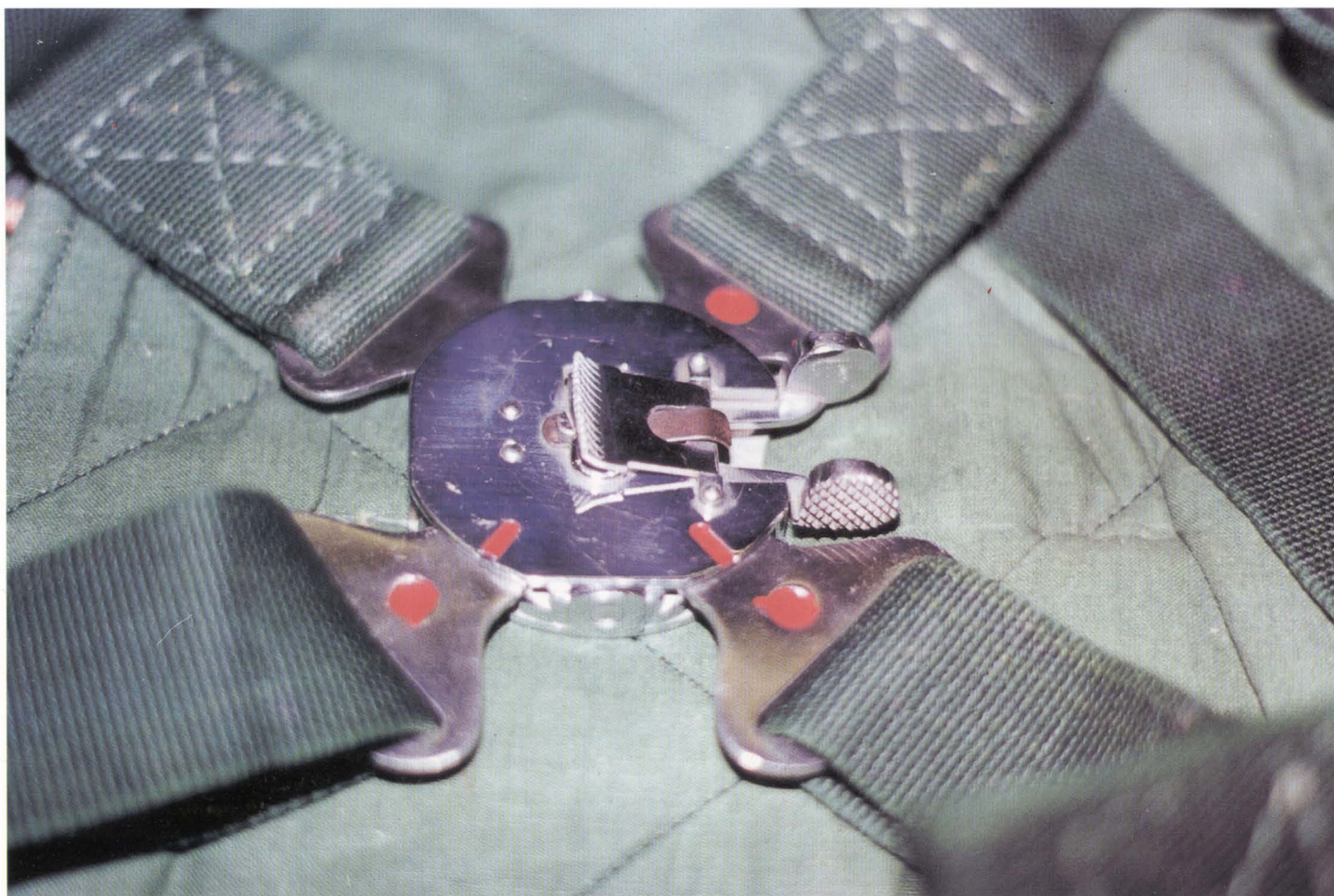


Top of deployment bag showing static line attachment.



Pack tray is an oval metal pan.

Japanese Navy



The Naval parachute quick release box has a non-rotating front plate that is hinged and opened by depressing twin tabs which are secured by a gate. The chest D-rings are for a weapons case.

Japanese Navy



The quick release box is permanently affixed to the harness at the upper right lug. Notice that the free lugs are so denoted by a red mark. The static line snap hook is an oval carabiner displayed here around the main harness D-ring.

Japanese Navy

Naval troop parachute container closure.



Container closed, locked with pin. Static line stowed.



Japanese Navy



Static line apex tie.



**Close up of Naval Troop
parachute canopy apex.**



Japanese Army paratroops attack in Dutch Sumatra 14-15 February 1942.





Japanese Army paratroopers in formation before their Nakajima Type 97 transports.





The exit position for an Army jumper: feet together, grasping the door rails, he will leap straight out in a vertical attitude extending his arms over his head.

The Army had a separate system with these virtues: a reserve, four risers on the main, and possibly a larger canopy. The Army system is quickly distinguished by its peculiar golden-orange color. Later they were reportedly green. The bulky, square reserve is activated by pulling a red rubber ball that dangles prominently from the right top and is the ripcord grip. The static line is stowed under flaps on the bottom of the container.

This system is not bag deployed. The static line opens the container by withdrawing a metal pin from a cord closing loop and snatches the canopy out into the breeze by break cord. The static line has a snap hook identical to the Naval and is 22'6" long. The Army system has the same quick release box. The reserve is mounted high on the harness by short risers.

The writer was fortunate to be supplied with a copy of a wartime Japanese film that documented the entire training process for Army paratroops.

Army jumpers certainly slipped their canopies as the training film proves. It is not unreasonable to believe that Navy troopers did as well. Curiously, the film shows the Army paras detaching, activating and dropping their reserves prior to landing.

This can be explained that they wanted speedier shedding of the rig on the ground and perhaps

avoid a possible face punch on landing by the reserve pack. Ripping the cord before jettison, probably is to reduce damage a packed reserve might incur on impact and the wrath of one's comrades if they had to dodge unguided missiles. The reserve was eliminated from the last system adopted, the Type 4, as superfluous.

The wartime training film demonstrates that the Army paras were well . . . even lavishly trained. Their aircraft exit method was to jump out arms stretched overhead but remaining vertical. Their landing fall, as practiced on mats, was an artistic front dive roll over the neck. This is a hazardous approach and can easily result in a cervical spine fracture. The design of the main with four risers suspending the jumper from the shoulders precludes the need to master a dive roll and indeed the film clearly shows the jump trainees landing on their feet, butts and backs.

Jump signals were a series of tones press buttoned from the pilot. Three tones meant 'Get Ready' at which the static jumpmaster fixed the static line to a bar over the exit door, which he also opened. Two tones stood for 'Standby' and the first jumper stood in the door. One final tone was equivalent to the green light and told the JM they were over the DZ. The trainees were then individually tapped out.

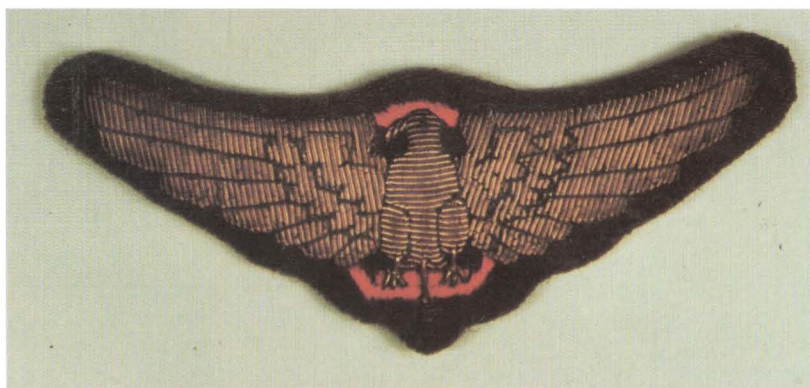


Information on the Japanese airborne is scanty. One source that is common is a reprinted extract³⁶ of a war-time U.S. intelligence product. It must be viewed with considerable skepticism however because of some ludicrous assertions therein. The statement that trainees were taught free falling from 4000' to minimize the danger of anoxia and delayed opening until 250-350' is absurd.³⁷ Hypoxia is no threat at 4000' and no one can gauge 350' in free fall by eye or instrument . . . in time. Those who tried have bounced with depressing regu-

larity. 350 feet at terminal velocity is almost two whole seconds to impact. Then on page forty-one the author(s) claim static lines of 25-26 meters, which would be over 82 feet.³⁸

No. Problems with translation maybe. Certainly a failure of technical review by qualified personnel. One envisions some POW interviews where the subjects decided to have some fun at the Yankee's expense.

The Army paratrooper badge was an embroidered representation of a mythical bird, the 'Golden Kite.'



Japanese Army Airborne Operations³⁹

14 Feb 1942	Palembang Indonesia	350 troops
15 Feb	Palembang Indonesia	100
21 Feb	Koepang (Timor)	350
22 Feb	Timor	350
21 Nov 1943	Taoyuan, Hunan China	60
6 Aug 1944	Hunan China	
29 Nov 1944	Bito and Buro, Leyte	45
6 Dec 1944	San Pablo, Leyte	750
	Dulag and Tacloban airfields	

³⁶ "Japanese Parachute Troops" Normount Technical Pubs.. Wickenburg AZ 1973

³⁷ Normount p.3

³⁸ Normount p.82

³⁹ Bragg & Turner p.201- 208

Japanese Army



The helmet and jumpsuit provide good protection from riser burns.

The bright red onion shape is the reserve ripcord grip.



The Japanese Army system is bright orange, a conventional suspension with four risers, and a flat reserve that covers the quick release.

Close up showing reserve attachment to main harness.



The army main parachute stowed the static line on the bottom of the pack tray under two flaps. The main canopy was not bag deployed, unlike the Navy rig, but the container was closed in a similar manner.





Japanese Army reserve. Static line snap hook secured to carrying loop.

Below: Japanese Army reserve – cover flap open exposing ripcord pins. The pins are affixed to the cable by wire wrap and solder.



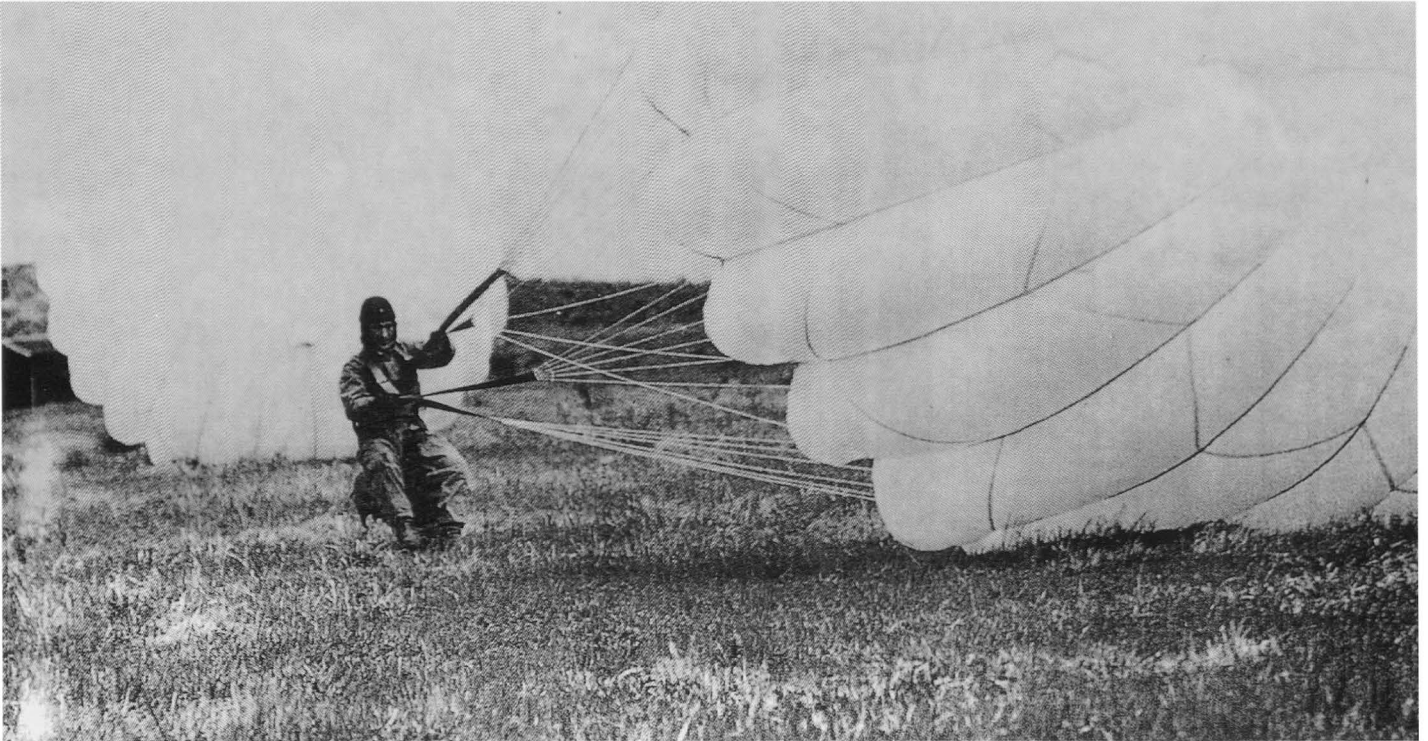


Japanese Army stalwart ready for airborne adventure.



Army trainees were instructed to make a leap straight out from the door extending their arms up.





These troops are using seat type escape parachutes presumably for drag-recovery training.

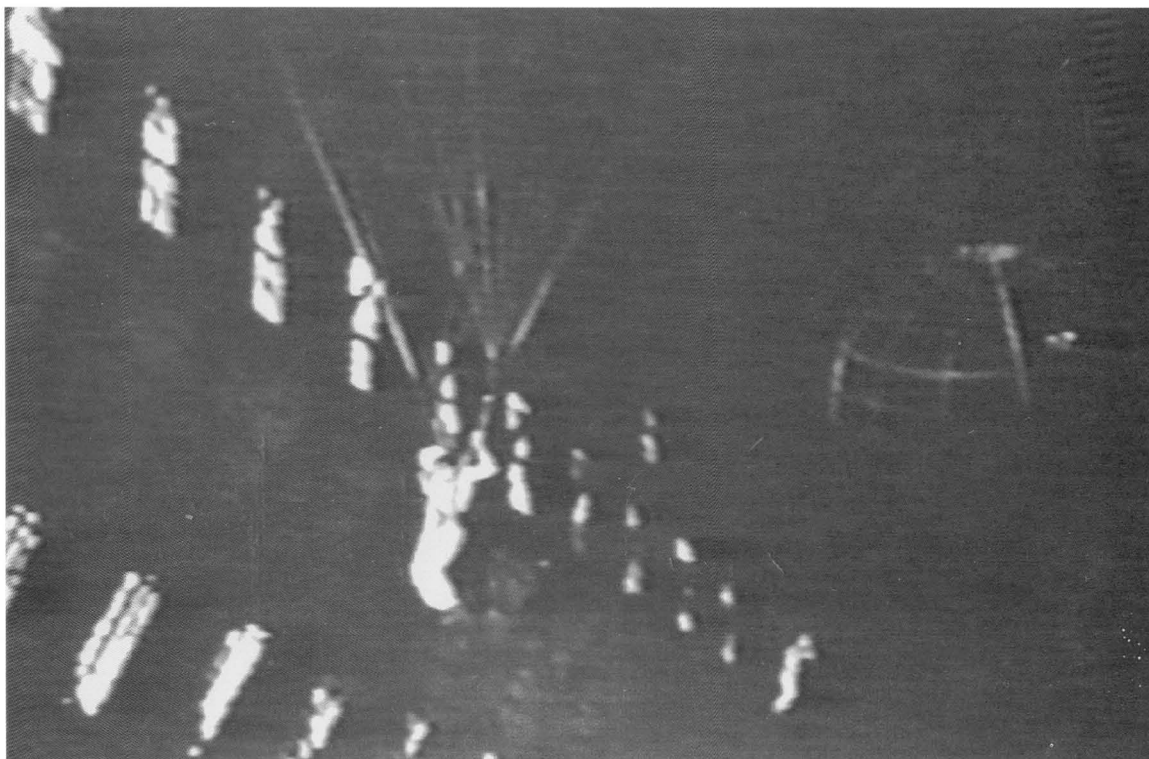


Japanese Army

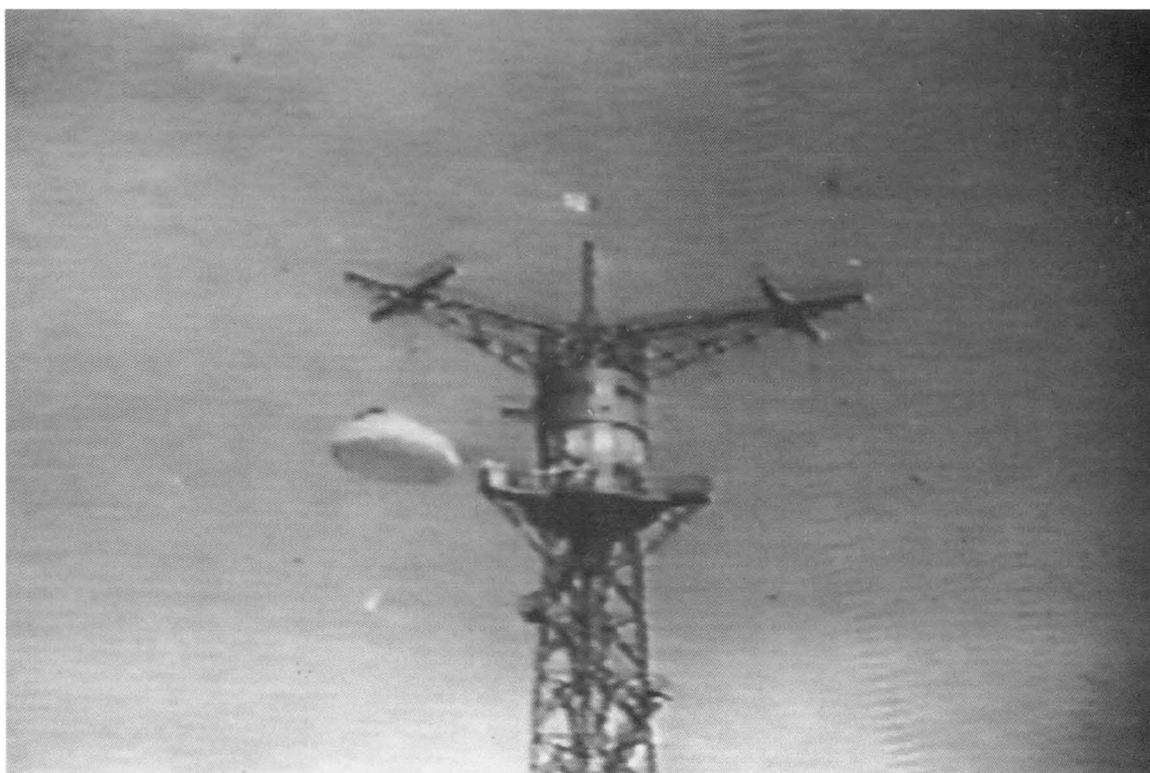


This photo of Army paratroops is noteworthy because they are not wearing reserves and appear to be equipped for a combat drop.

Japanese Army

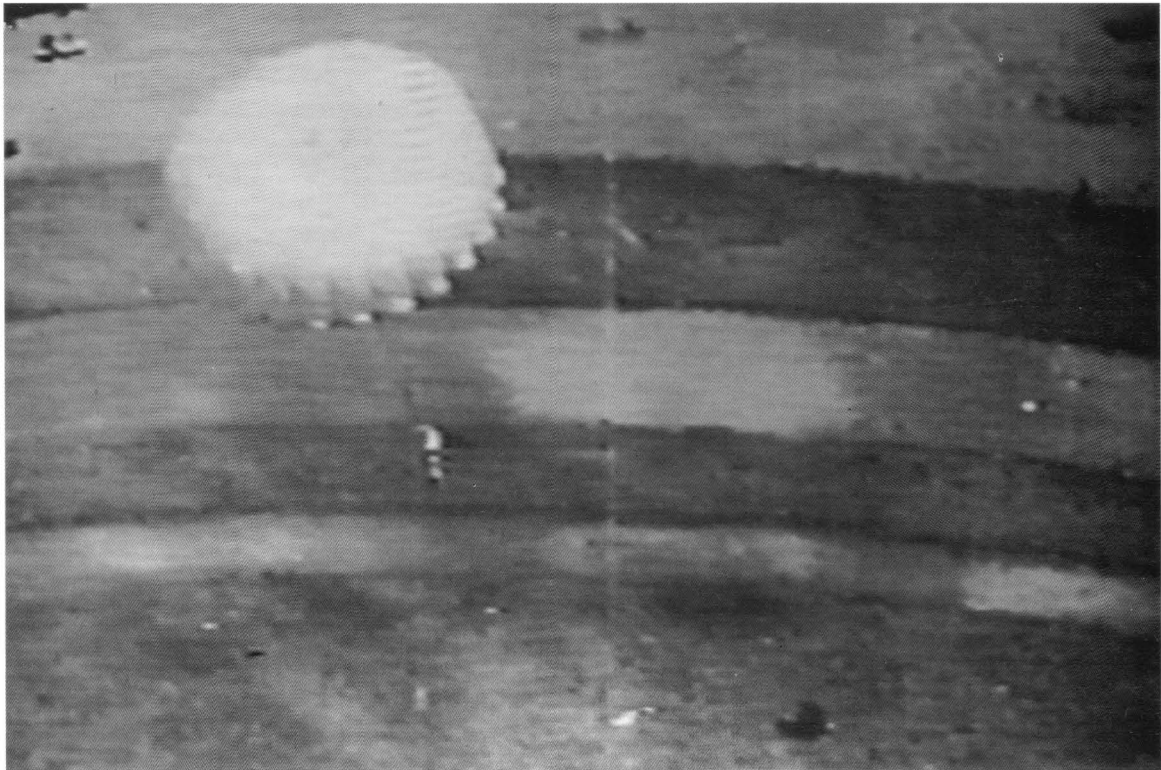


Army trainees were free dropped under a canopy for a short distance within a hangar. The figure behind is swinging beneath a metal hoop canopy simulator that is a landing training device.



The free tower. Operationally the same as the towers at Fort Benning.

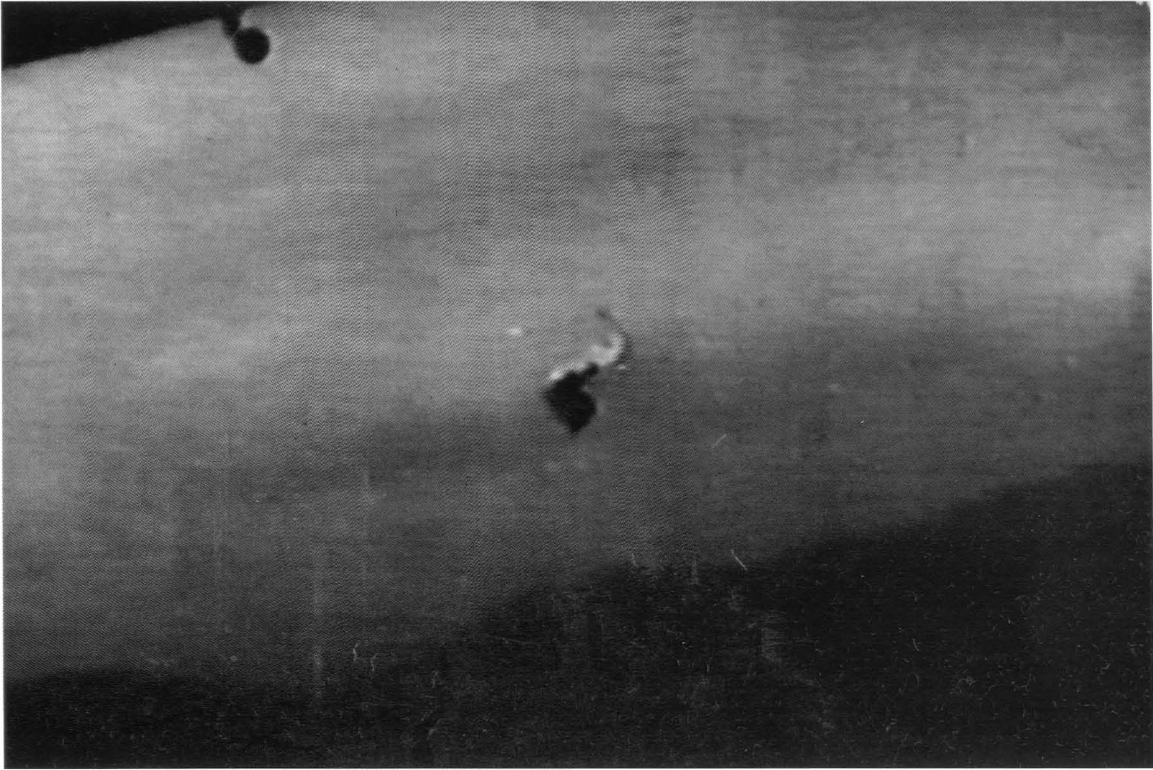
Japanese Army



Canopy, fully inflated, as seen from the top of the tower.



Jumpmasters performing pre-jump inspection. Their format is similar to the U.S. ritual.



The jump. The canopy apex is still attached to the static line by break cord.



The static line has pulled the canopy peak out into the slipstream.

Japanese Army



The canopy momentarily squids as it fills, lines are fully stretched and the trooper has the satisfying experience of opening shock.



The most curious aspect of the Japanese Army method – jettisoning the reserve.



A close view of a trainee dropping his activated reserve. The preceding nine photos were extracted from a wartime film that documented the entire Army parachute course and ended with a mass drop for a mock attack.

Glossary

AAF (USAAF): Army Air Forces 1941-47 , previously Air Corps 1921-1941.

Adapter: a metal rectangular fitting with a crossbar that joins harness webbing.

AGL: Above Ground Level. The altitude that most concerns parachutists. A variable.

Anchor line: cable-steel cable inside aircraft to which static lines are attached.

Apex: the very top of the canopy, usually vented.

Assistor pockets: small fabric pockets fixed to skirt that fill rapidly and assist in inflation.

Becket: a sewn loop to which a temporary connection is made by break cord.

Bias construction: canopy fabric warp placed forty-five degrees from the vertical . For additional strength.

Canopy: the expanse of fabric that retards the fall of the load. May be circular, square or triangular.

Cones: parachute pack releasing cones. Small chrome plated brass cone shaped hardware that is part of the pack closing arrangement on ripcord operated parachutes. Plated brass grommets fit over these and a ripcord pin locks the flaps by passing through holes at the top of the cone. .

Container: (also pack tray if rigid) the outer fabric envelope of the parachute pack (British – outer bag).

“Crash and burn”: slang for a jumpers experience of a hard landing.

Cross connector strap (also spreader bar): a load bearing capable connection between risers that prevents canopy collapse if one side should fail. Found in reserves between the harness snaps.

Deployment bag: a cloth bag that contains and retains the packed canopy until its suspension lines are deployed, also known as the inner bag.

Despatcher: British term for static jumpmaster.

Drop Zone: the intended landing place for parachutists

Friction adapter: metal fitting with a sliding crossbar that has a serrated gripping edge for a quick fit adjustment.

Glider patch: common term for the round overseas cap patch that combined the parachute and glider symbols. Tradition was for troopers to sew a silver dollar under this insignia, which on occasion served as a weapon or cab fare as circumstances dictated.

Gore: (formerly panel) wedge shaped sector of canopy between suspension lines from skirt to apex. Sub-divided into panels.

Griswold bag: A zippered, padded case that encloses a disassembled M1 rifle and attaches to parachute harness under the reserve. Current version is larger worn on left side and snapped to reserve D-ring.

JMPI: Jumpmaster personnel inspection.

Jump pay: additional incentive pay for the hazardous duty. The \$50 extra U.S. troopers received was a hefty sum in the 1940s. Officers received \$100 per month additional.⁴⁰

Jump rope: a 25' hemp line, standard U.S. airborne issue (World War II), intended for climbing down from trees.

Jump status: Condition of service for a soldier or unit whose duties include parachuting.

Jumpmaster: an experienced parachutist who is responsible for the jump operation from the departure airfield to assembly on the drop zone. He may jump with the troops or be 'static.'

Lateral drift: horizontal movement over ground under canopy. Caused by wind. Relieved by jumper pulling a slip into the wind. A big threat to the jumper.

"Leg": pejorative term for all non-jumpers. From 'straight-leg' referring to a lack of jump boots and the uninterrupted leg trousers.

Leg bag: a British innovation for combat equipment accompanying the jumper. Attached to parachute harness by 20' rope and hand held by jumper through the exit door. It resembles a short duffel bag with a lace up closing.

'Mae West': (line-over, blown periphery, partial inversion) a low speed partial malfunction in which the skirt is pushed through the lines on the other side, creates a lobe that inflates at the expense of the canopy surface area. Often asymmetrical, when equal lobes are produced they will appear to be a huge bra, hence the name (from a rather well endowed actress of the 1930s and 1940s). 'Mae West' was also nick name for an inflatable flotation device commonly worn by aviators over water.

MSL: Mean Sea Level. The theoretical plane from which aviators reckon their altitude. A constant.

Musette bag: a standard U.S. item of field equipment (World War II). Attached by jumpers to harness under reserve.

Oscillation: pendulum like swinging of suspended load under a developed canopy. Caused by trapped air venting under skirt. Relieved by jumper pulling a slip. Unchecked usually gets worse.

Pack Opening Elastics: bungee cords that apply spring tension to a container flap and pull it away from the enclosed canopy upon activation. Also Pack Opening Bands.

Pack Opening Spring Bands: same as above except incorporate metal coil springs. Adopted (1948 by U.S. from German design) to ensure function in extreme low temperatures.

Permeability: rate at which air passes through a fabric

Pilot chute: a small canopy that is deployed in advance of the main. It serves as an anchor and pulls the main canopy out of the container. May or may not be spring actuated.

⁴⁰ "Paratrooper!" Devlin p.119

PLF: Parachute landing fall. The very best way to absorb the impact of landing. Devised by FltLt Kilkenny RAF late-1941, early-1942. It is the placement of the fleshy body areas in sequence on the ground, i.e., balls of feet, side of calf, thigh, buttocks, side of back with the elbows tucked in close and head lowered. Expertly done it produces a roll that rebounds the jumper back to his feet where he can run around his canopy collapsing it to avoid a wind-drag.

Porosity: a ratio of voids or blank spaces to an area or volume. Often mistakenly used for permeability.

Pucker bands (Taschengurts): a short tape sewn at skirt from gore to gore that draws them together to pucker the gores to assist inflation. Also "pocket bands." Added to T7 reserve making T7A.

QAC: Quick Attachable Chest. An aircrew escape parachute system in which the airman wears a harness and when needed clips on the appropriate chest type then bails out.

Quick release assembly: ("Bang Box", "Dial of Death") a single point release device that connects the leg and chest straps and was considered an advancement because of its faster egress.

Ripcord: a steel cable to which steel pins are fixed that closes a parachute pack.

Ripstop: a postwar development, a type of weave designed to resist tears. Identified by its continuous box pattern.

Risers: (also main lift webs) extensions of the harness to which suspension lines are attached.

Serving: a tight binding of thread or cord around rope holding it together

Skirt: (lower lateral band) reinforced bottom hem of canopy.

Static line: a line connecting the parachute pack to a point, usually a cable, in the aircraft that automatically begins the deployment as the load falls away.

Stick: a line of parachutists aloft or in the airplane.

Stow loops: (hesitator loops) cloth or web loops that hold the suspension lines in a neat arrangement on a deployment bag or in a pack tray and pay the lines out during development.

Streamer: ("Roman candle" from its flickering flame-like appearance) a partial, high speed malfunction in which the canopy is stretched out but does not inflate.

Suspension lines: (also shroud or rigging lines) cords that connect canopy to load.

Total: a malfunction where nothing comes out. Caused by cut static line, broken snap hook, anchor cable defect or failure to 'hook up.' This high speed event has a good aspect – there is nothing above the jumper to entangle his reserve or capture the reserve pilot chute.

Warp and weft, -woof, -fill: Three ways of saying the same thing. Warp are the long threads in a weave and run parallel to the selvage edge. Weft, woof, fill are the short threads in a weave.

Warp: the long threads in a bolt of cloth

Wings oval: a decorative cloth background in Regimental colors that serve as jump status designator.

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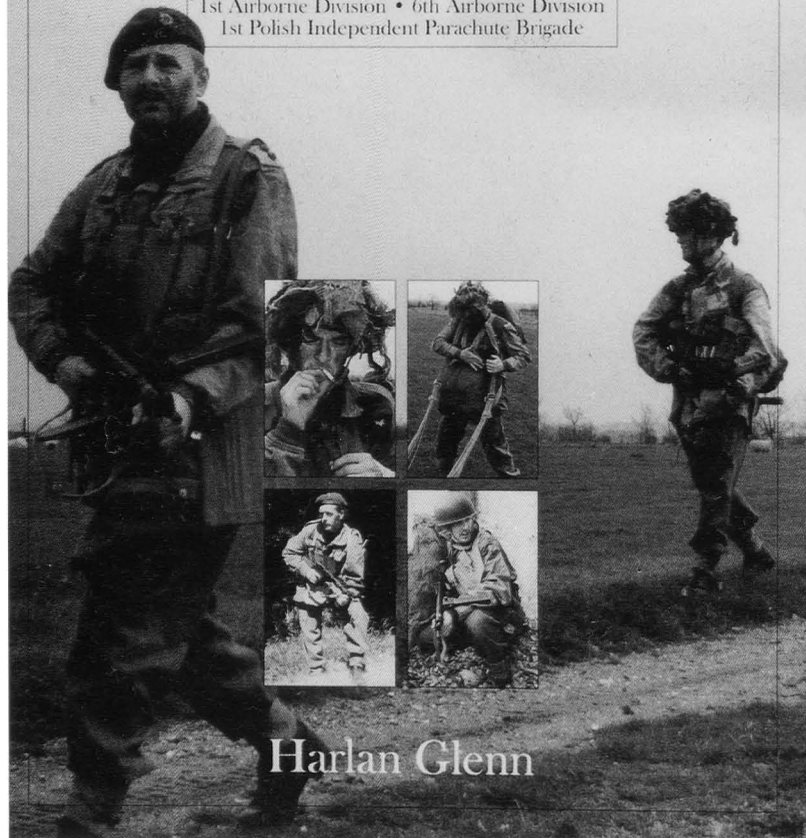
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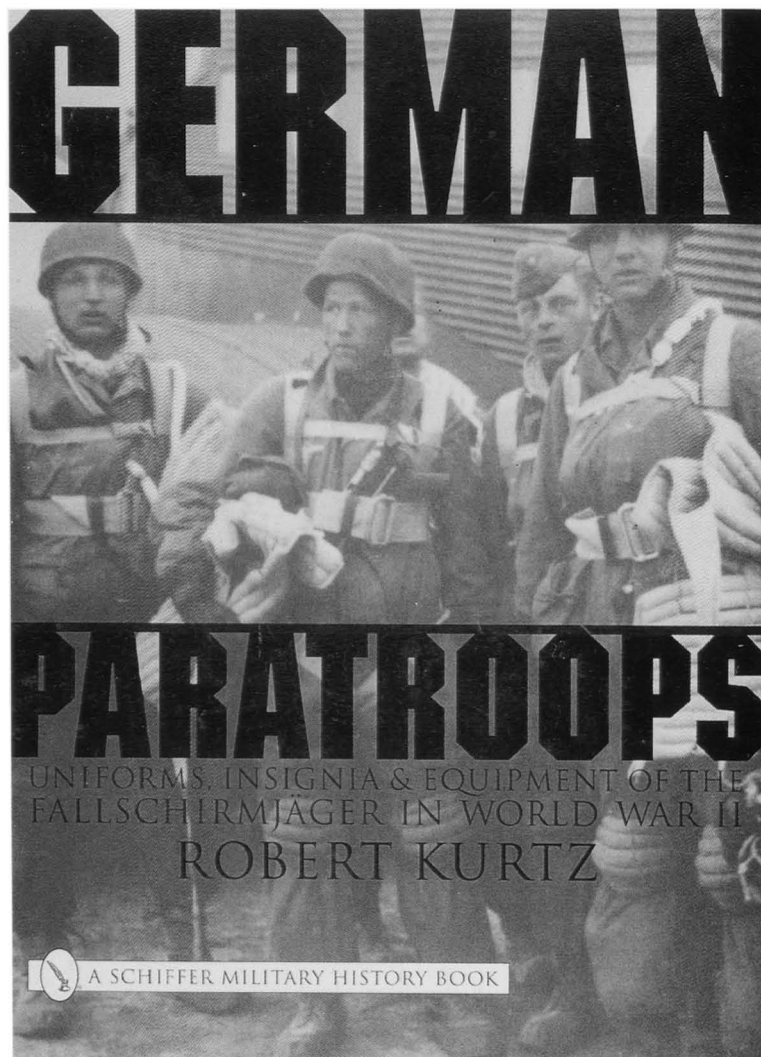
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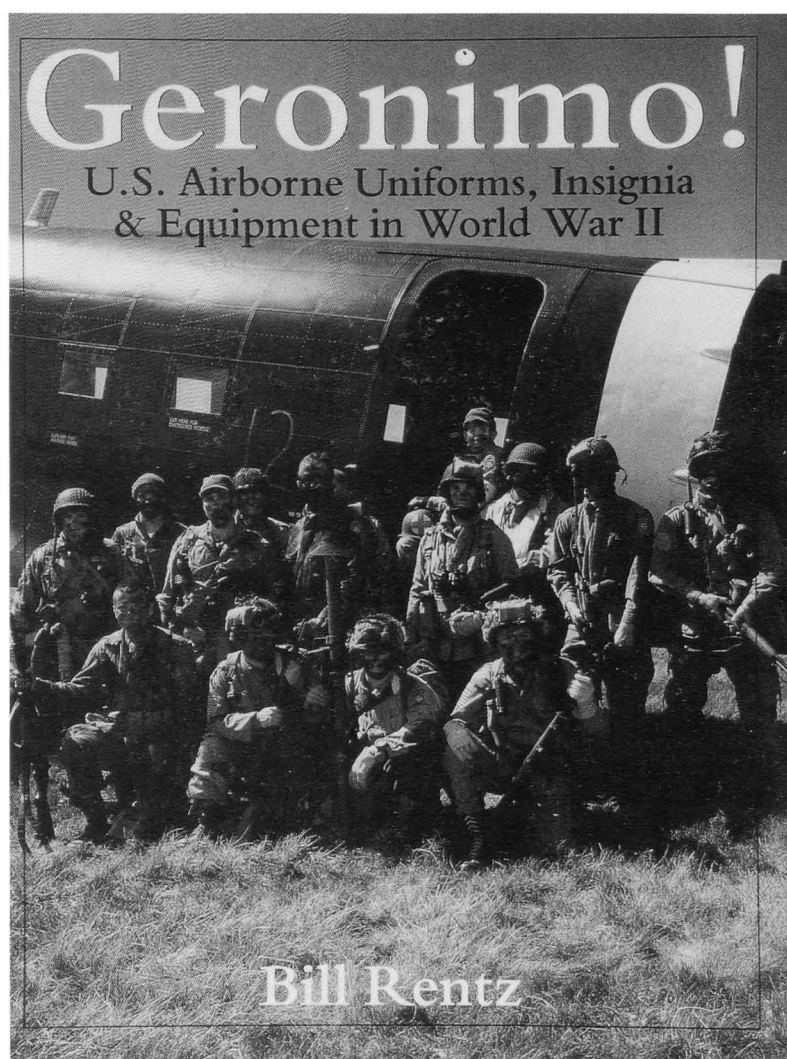


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