

# LIGHT MACHINE GUN

## ZB 30



Manufactured by

Československá Zbrojovka, akciová společnost v Brně

(Czechoslovak Arms Manufacturing Works Ltd. in Brno)

Brno, Czechoslovakia

# LIGHT MACHINE GUN ZB 30

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ZB 30

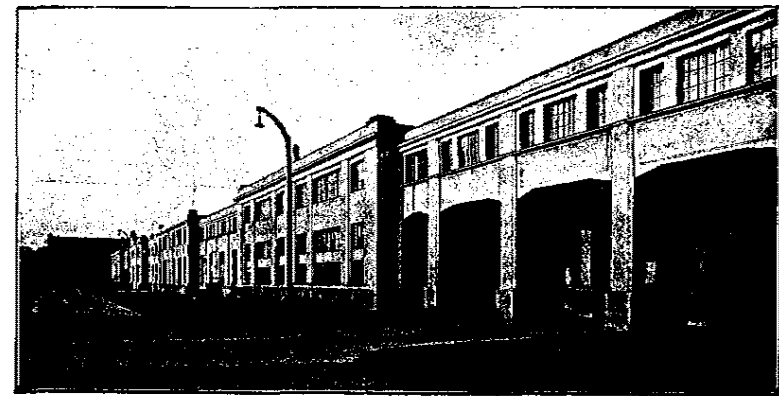
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## I INTRODUCTION

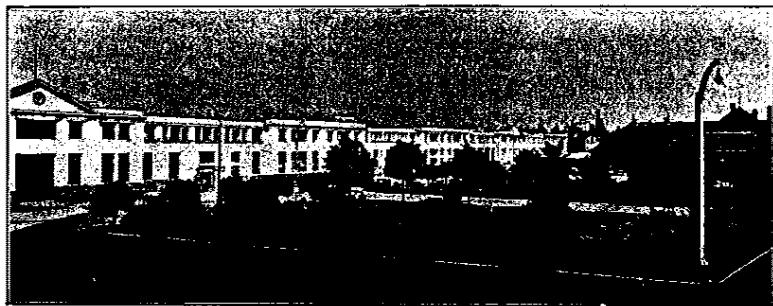
Československá Zbrojovka akciová společnost v Brně (Czechoslovak Arms Manufacturing Works Ltd. in Brno) was developed from a branch of the Vienna arsenal and had, therefore, the benefit of the concentrated manufacturing experience of arms factories of the former Central Powers. This experience was supplemented by the latest technical methods and the factory's own system of tolerances created specially for the manufacture of arms. It rapidly attracted the attention of military experts and was invited to participate at the arms competitions held by different countries after the War. In these competitions the firm was able to demonstrate arms which within a few years have gained it a world-wide reputation.

To a great extent the success of Zbrojovka's arms is due to the fact that during its organization period after the War the entire machinery and equipment were purchased at just the time when the best technical advantages could be derived from the extraordinary development and progress made in machine tools. The best obtainable materials are used by the factory (let us mention here Poldi steels only) which constitutes an additional guaranty of the quality of Zbrojovka's arms.



Zbrojovka's factory

Though Zbrojovka manufactures peace-time articles also, its principal activity lies in the manufacture of the following military arms: service rifles Mauser of different models, automatic rifles, light machine guns, machine guns, „aircraft” machine guns (the calibre of all these arms can be made for almost any kind of ammunition); heavy machine guns and extra-heavy machine guns.



Zbrojovka's factory

## II TACTICAL TASKS OF THE LIGHT MACHINE GUN

Soon after the War started it was discovered that the equipment of the infantry with normal rifles and machine guns did not fully answer the requirements of the new field tactics already developed in the first months of that greatest struggle in man's history. It took but a short time to find out that the machine guns when intended to advance in line with the first waves met such difficulties that their full use was impossible. As a result of this handicap urgent need was felt for a light automatic weapon which would have a high capacity for fire.

All arms factories were so overloaded with urgent mass production, replenishing losses of arms on the battlefields, that they could not proceed systematically with work in this entirely new field of arms technique. In order, however, to satisfy at least partially these requirements, they tried to reduce the weight of heavy machine guns but it was only when the war ended that they had full opportunity to make intensive efforts towards creating an efficient light machine gun. The demand for such a weapon being large, the first stages of its development succeeded each other with great rapidity, so that already in the year 1924 the military experts had in hand a light machine gun that to a high degree satisfied the technical and tactical requirements of the field.

In the following text is described light machine gun ZB 30 which, after being submitted to rigorous tests at a large number of international arms competitions, was introduced with complete success in the armies of several countries.

## III GENERAL INFORMATION

Light machine gun ZB 30 is an automatic fire-arm. The energy for the operation of the gun is furnished by the expanding powder gases. The perfect locking of the mechanism at the moment the shot is

being fired and the fixed, air-cooled barrel which can be easily changed are outstanding features of this gun. After the gun is fired and the bullet has passed the gas port near the muzzle, the live powder gases expand through the gas port into the gas cylinder setting into motion the piston which is connected with the slide.

Feeding is accomplished from a magazine holding 20 rounds in two rows placed vertically into the top of the receiver. Empty shells are thrown out down in a forward direction. After the last shot has been fired the breech remains open allowing continuation of fire without manipulating the mechanism as soon as a new magazine has been inserted into the receiver.

#### IV MEASUREMENTS AND WEIGHTS

Weight of gun without sling strap	about 9 kilogrammes
Weight of operating mechanism, viz: piston with slide, complete bolt, operating rod and 1/2 recoil spring	about 1,290 grammes
Magazine empty (to hold 20 rounds)	about 320 grammes
Weight of barrel completely adjusted	about 2,460 grammes
Length of gun with flash hider	1,165 millimetres
Length of barrel without flash hider	602 millimetres
Length of rifled part of barrel	513.5 millimetres
Length of twist (constant right handed)	240 millimetres
Distance between sights	568 millimetres
Sight graduated by 100 metres	from 200 to 1,500 metres
Theoretical rate of fire	570-650 shots per minute
Practical rate of fire	about 120 shots per minute
Maximum practical rate of fire	about 240 shots per minute

Weight of magazine filling machine	about 525 grammes
Weight of live cartridge Mauser „S“ calibre 7.92 mm	24.6 grammes
Weight of 5 cartridges set in strip	about 135 grammes

As light machine gun ZB 30 can be supplied to suit any kind of current rifle ammunition, calibres 6.5 to 8 millimetres, several of the above values had to be shown in approximate figures only.

#### V GENERAL DESCRIPTION

The barrel (10) surface of light machine gun ZB 30 is designed to form circular cooling ribs. It has a spring-jointed, adjustable handle with a wooden grip. The handle is mounted on the barrel by means of a collar which allows it to be tipped around the barrel. This handle facilitates easy and quick changing of the barrel, even when hot, helps in quick transportation of the gun and gives a firm grip of the weapon during fire.

The surface of the rear end of the barrel is threaded, the thread being three times interrupted to correspond to a similar arrangement in the barrel locking nut (16). By lifting the barrel locking nut finger the barrel is unlocked and comes easily out of the nut when pulled forward. When inserting the barrel the operation is reversed.

On the front end of the barrel is mounted the gas driver (33) with front sight (18) and the flash hider (55). The gases which set the operating mechanism into motion pass through the gas port in the barrel and the gas driver canal into the gas cylinder tube (34) where the gas impinges upon the head of the gas piston and drives it backward.

The size of the gas port can be regulated by a gas regulator (152) thus changing the quantity of gases entering into the gas cylinder tube (34) and regulating the rate of fire. A further advantage of the gas regulator is that it removes possible inconveniences arising from use

of ammunition which develops diverse pressures of powder charges. In the gas cylinder tube (34) moves a piston (32) which is joined to the slide (23). The top side of the rear half of the slide has beveled surfaces on which glide the lugs of the bolt (72) causing it to rise or descend. The bottom of the slide is beveled in such a way as to permit action of the trigger mechanism. Against the rear end of the slide presses the operating rod (45) which transfers the backward movement of the slide to the recoil spring (135) compressing it, and transfers the accumulated force of the recoil spring (135) to the slide when the latter moves forward.

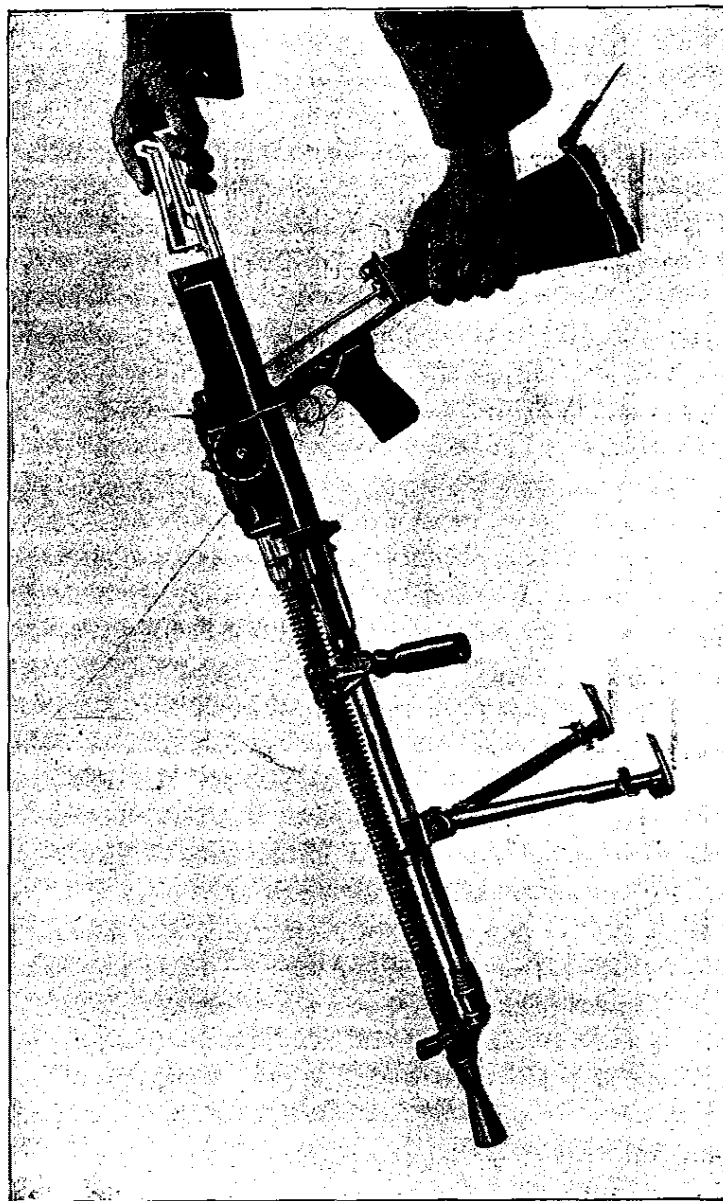
The front end of the bolt forms a bed for the base of the cartridge. Into this bed engages a spring-loaded extractor (64). In the center of the bed is a small hole for the point of the firing pin (68). This point is dull.

Between the slide (23) and the bolt (72) is unlocking piece (146), resting in the slide and working by means of a spring. It is designed to soften the very beginning of the extraction of the empty shell from the chamber, permitting easy adjustment of light machine gun ZB 30 to different kinds of ammunition.

The inner surfaces of the walls of the receiver (42) serve as guides to the breech mechanism. An opening is cut in the top of the receiver to admit the mouth of a magazine, which is hooked into place and secured by a spring magazine catch (66). The bottom of the receiver has an opening through which the empty cartridge cases are ejected. Both openings can be closed by sliding dust covers.

The rear sight is dovetailed into the left side wall of the receiver. The rear sight bracket (13) into which the sighting notch is cut turns on a pivot, the desired position being obtained by means of a spiral shaped cam (57) moved by the range drum (3) to which it is solidly secured. The outside surface of the range drum (3) bears range scale figures which appear large and distinct through an opening cut in the rear sight housing.

The trigger guard (41), in one group with the trigger guard piece (50)



Method of stripping breech mechanism

and the butt stock (31), is joined to the receiver by 2 trigger guard pins (5). The trigger guard (41) houses the trigger mechanism which is designed to allow automatic or single fire as well as "safety".

When the rear trigger guard pin (5) is pushed out, it is possible to fold down the trigger guard together with butt stock, pivoting on the front trigger guard pin (5). In this position the bolt mechanism can easily be removed. If both trigger guard pins are pushed out, the trigger guard (41) together with the butt stock can be stripped from the receiver.

To the trigger guard is attached the butt stock (31) which houses the spring tube (56) with the recoil spring (135). The bottom of the butt stock is enclosed in a spring butt plate (2) which carries an adjustable shoulder piece (47).

About the middle of the gas cylinder tube is attached the bipod which has legs of telescopic design permitting adjustment to suit any irregularities of the ground. During transport the legs are folded against the gas cylinder tube.

In the shoes of the front legs (30) are holes for pegs to fasten the gun tightly to the ground. The bipod is so designed that it permits traversing of the light machine gun in horizontal direction even when the legs are fixed to the ground.

## VI GENERAL ACTION

### Forward movement:

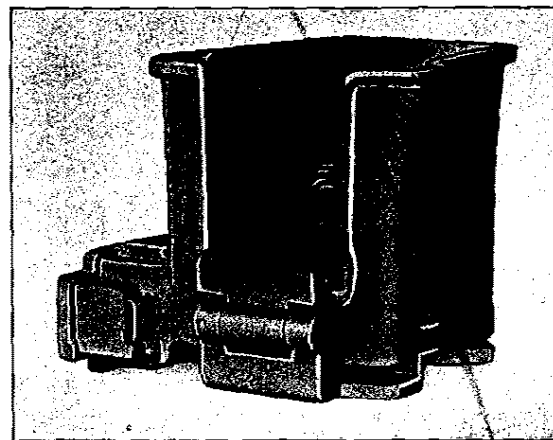
Before firing the first shot, the gun is cocked by pulling the operating handle (49) backward until the sear (52) engages on the slide. When trigger (51) is pulled, the sear declines and releases the slide (23), which is forced forward by the operating rod (45) set into motion by the recoil spring (135). As the bolt (72) carried on the slide moves forward, the lug on its upper part strikes the back of the next cartridge in the magazine and strips it out and into the chamber. The extractor (64) engages on the rim of the base of the cartridge.

Towards the end of the forward movement of the slide the bolt rises on the beveled lugs of the slide, comes to a gradual stop and becomes locked between the rear end of the barrel and the bolt locking plate (28). The bolt is completely locked but the slide continues forward; its hammer strikes the firing pin (68) and primes the cartridge.

### Backward movement:

When the charge explodes and the bullet passes the gas port near the muzzle, the expanding powder gases pass through the gas port in the barrel and the canal of the gas deriver (33) into the gas cylinder (34). These gases impinge upon the head of the gas piston, which drives the mechanism backward effecting the unlocking of the bolt, opening of the breech and extraction of the empty shell. The empty shell being held by the extractor (64) is drawn from the chamber with the bolt and remains in its face until its side strikes the ejector (63), when it is thrown out through an opening in the bottom of the receiver. The energy of the rearward movement of the breech mechanism accumulates in the recoil spring, compressing it. When the rearward movement has been arrested the accumulated energy of the recoil spring starts to act and forces the mechanism to repeat the forward movement.

After the last cartridge has been fired the mechanism remains open



Magazine filling machine, folded

and in its cocked position which allows immediate continuation of fire as soon as a new magazine has been inserted into the receiver. The above describes the action of the gun during automatic fire. If the safety catch (37) is set into position for single fire, the breech mechanism is arrested by the sear (52) in its cocked position after each shot so that it is necessary to release and pull the trigger to fire a new shot.

If the safety catch (37) is set to "O" (safe) the trigger does not engage on the sear and the gun cannot be fired.

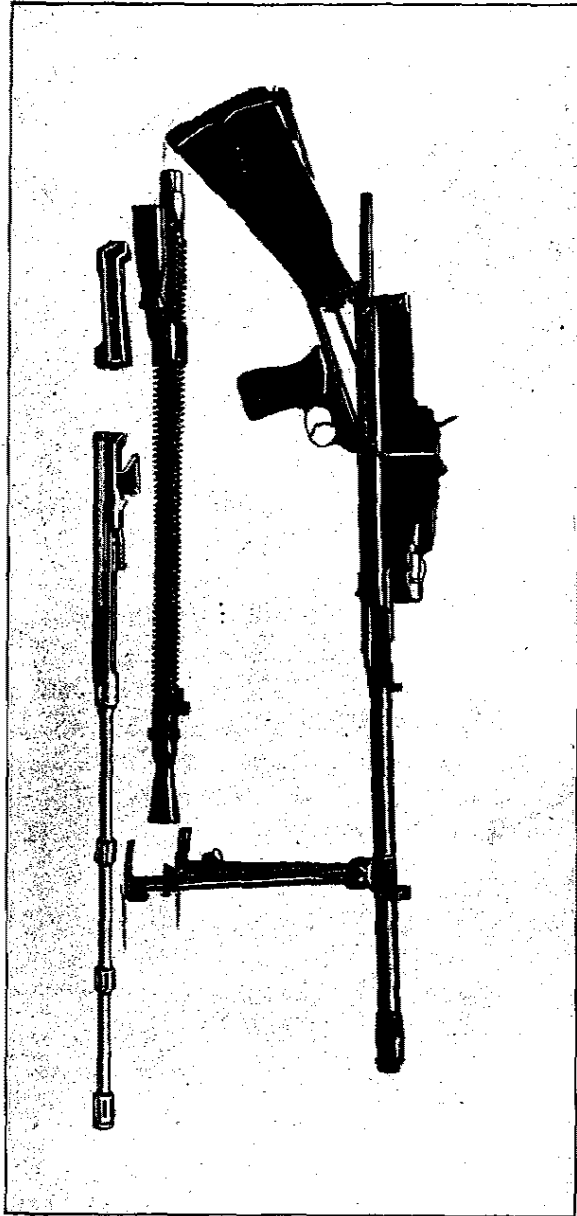


Method of filling magazine



Method of changing barrels





## VII MAGAZINE AND MAGAZINE FILLING MACHINE

The magazine for light machine gun ZB 30 is designed to hold 20 rounds in two rows. This magazine contains a zigzag shaped plate spring, one end of which is fixed to the bottom plate of the magazine. On its other end the spring carries a follower which forces the cartridge against the lips of the magazine tube and holds it in place until stripped out by the lug on the top of the bolt.

The magazines are filled by a crank-operated filling machine made of silumine.

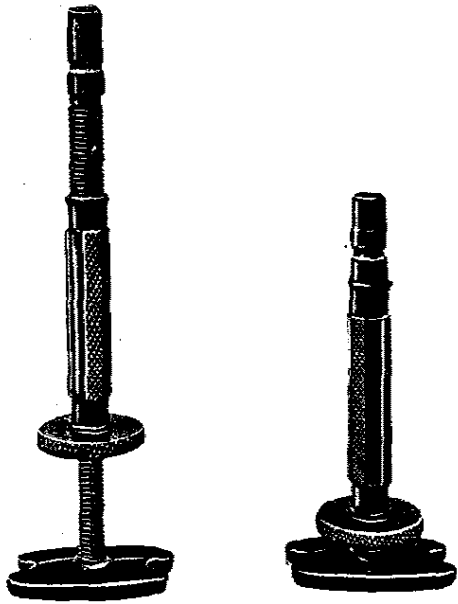
## VIII DISMOUNTING AND ASSEMBLING

The gun can be dismounted and assembled with great ease and rapidity, its construction being such that the parts are combined into assembling groups. Such design not only facilitates dismounting of the gun but also diminishes danger of loss of small parts. Partial dismounting and assembling of the gun for cleaning can be accomplished with a cartridge. Complete dismounting necessitates the use of a special combination wrench. Stripping of the gun for cleaning purposes and making it ready for fire are so simple that they can easily be accomplished even in complete darkness or while gas masks are used by men during fire.

## IX SPECIAL EQUIPMENT

If desired, the gun may be provided with the following additional equipment which will considerably increase its utility, viz: third leg, traversing mechanism, anti-aircraft sight and tripod.

The telescopic third leg which can be inserted into the butt stock is found very convenient when it is desired to keep the range undisturbed during fire. By manipulating the grip of the third leg different elevations are obtained. The traversing mechanism on which the third leg glides permits application of swinging traverse fire. The desired width of traverse is adjustable by two stops.

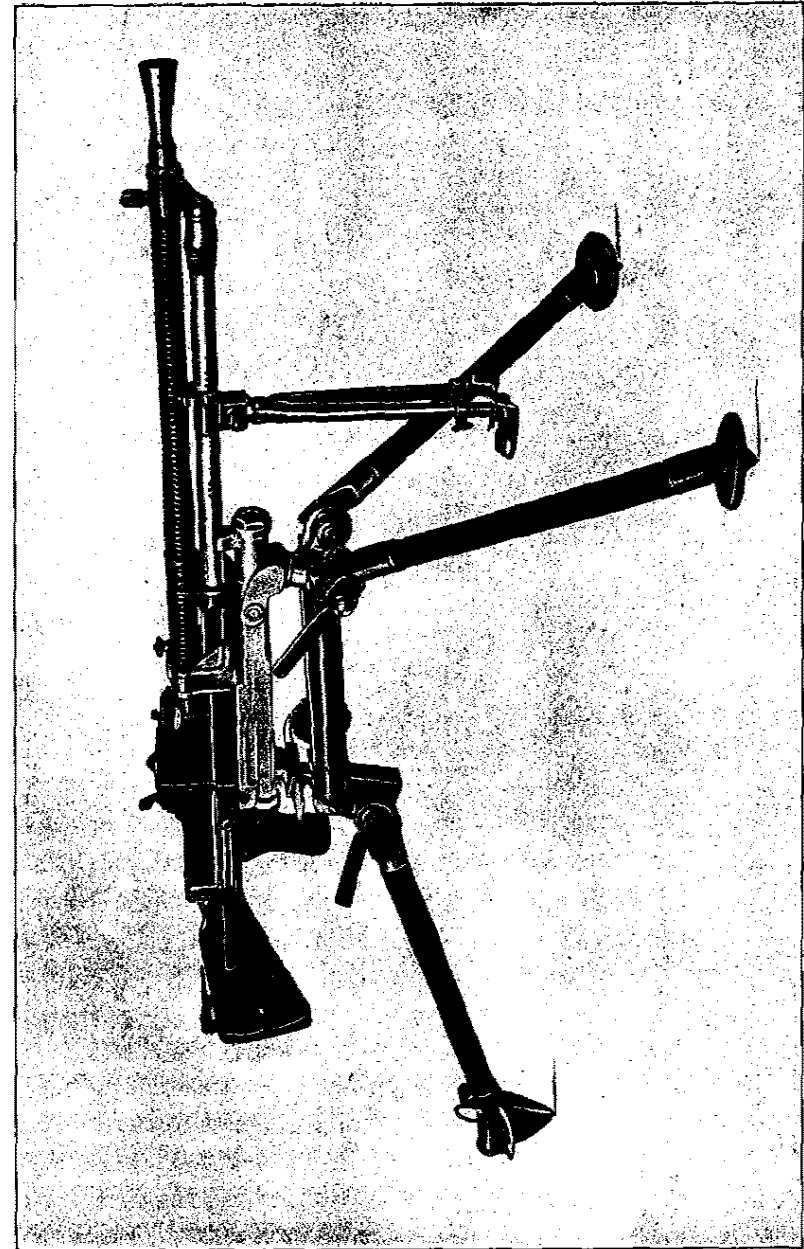


Telescopic third (rear) leg

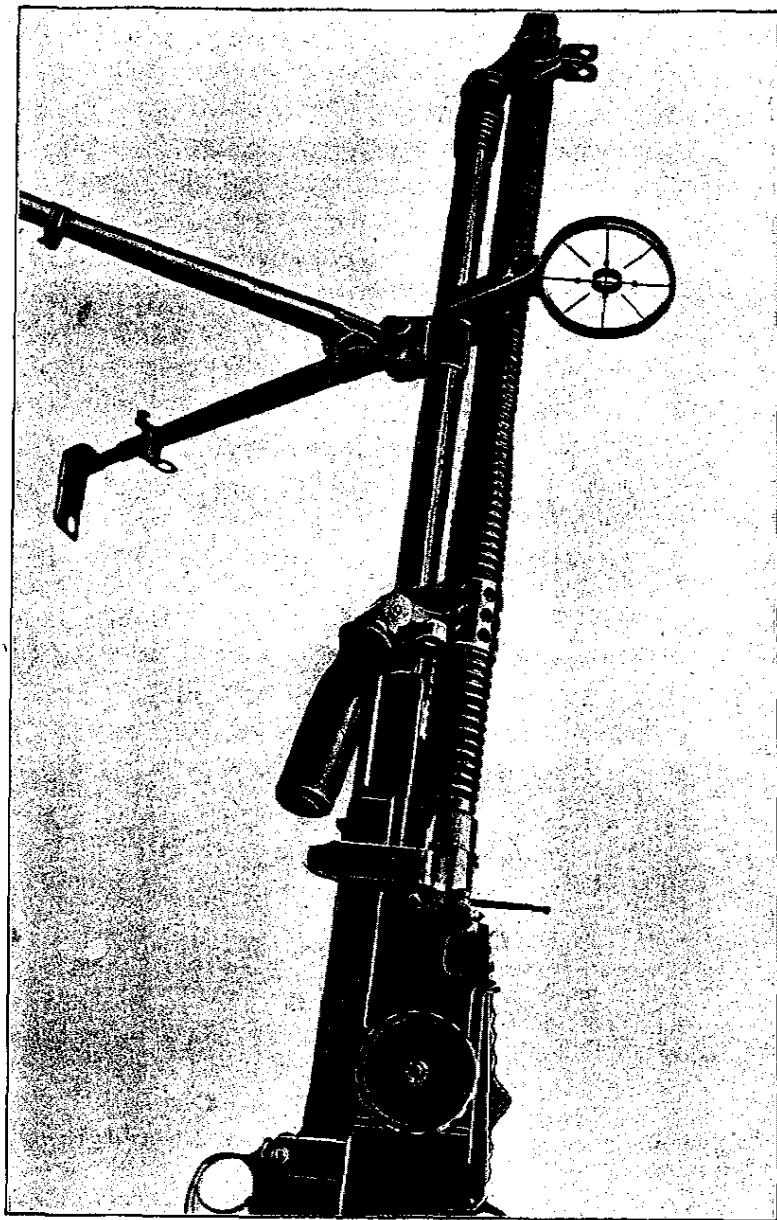
An anti-aircraft sight can easily be attached to this gun.  
A tripod can be supplied with this light machine gun to be used either for normal or anti-aircraft fire.

## X PRINCIPAL ADVANTAGES

The gas port is situated near the muzzle and the action of the gases on the piston begins only when the bullet has left the rifled part of the barrel. This eliminates the danger of having 2 bullets in the barrel. The changing of a hot barrel for a fresh one requires only 2 seconds so that continuity of fire does not suffer.



ZB 30 in firing position mounted on tripod



The gun is superior to all other light machine guns of its type in the ingenious simplicity of its design and only the best materials are used, guaranteeing a high durability of all parts.

No manipulating of the operating handle during fire being necessary and the feeding arrangement being very simple, a high practical rate of fire can be obtained. The construction of light machine gun ZB 30 is such that it will fire even if the mechanism is not lubricated or is dirty, a feature which makes it suitable for even the worst conditions of service in the field.

The training of gunners does not require much time as the handling of the gun is not complicated.

The factory guarantees absolute interchangeability of all parts, which can be effected without any adjustments.

## XI MANUFACTURE OF LIGHT MACHINE GUN ZB

Each part is carefully controlled during the process of its manufacture and after its completion it must pass a severe control for size and thermal treatment at the central control department of the factory. The factory guarantees that only guns assembled of parts in every respect perfect and fully interchangeable leave its Works.



ZB 30 mounted on tripod adjusted for anti-aircraft firing

## NOTE

As it is necessary that the spiral shaped cam be adjusted to the characteristics of ammunition and atmospheric conditions of different countries, it is requested that buyers when ordering light machine guns ZB supply the following information: muzzle velocity and pressure of ammunition, average barometric pressure, average humidity and average atmospheric temperature in the country of destination. The factory will adjust the spiral shaped cam accordingly.