= PIAT =

The Projector , Infantry , Anti Tank (PIAT) Mk I was a British man @-@ portable anti @-@ tank weapon developed during the Second World War . The PIAT was designed in 1942 in response to the British Army 's need for a more effective infantry anti @-@ tank weapon , and entered service in 1943 .

The PIAT was based on the spigot mortar system , that launched a 2 @.@ 5 pound (1 @.@ 1 kg) bomb using a powerful spring and a cartridge in the tail of the projectile . It possessed an effective range of approximately 115 yards (110 m) in a direct fire anti @-@ tank role , and 350 yards (320 m) in an indirect fire ' house @-@ breaking ' role . The PIAT had several advantages over other infantry anti @-@ tank weapons of the period , which included a lack of muzzle smoke to reveal the position of the user , and an inexpensive barrel ; however , the type also had some disadvantages , a difficulty in cocking the weapon , the fragility of the barrel , powerful recoil , and problems with ammunition reliability .

The PIAT was first used during the Allied invasion of Sicily in 1943 , and remained in use with British and Commonwealth forces until the early 1950s . PIATs were supplied to or obtained by other nations and forces , including the Soviet Union (through Lend Lease) , the French resistance , the Polish Underground , and the Israeli Haganah (which used PIATs during the 1948 Arab ? Israeli War) . Six members of the British and Commonwealth armed forces received Victoria Crosses for their use of the PIAT in combat .

= = Development = =

At the beginning of the Second World War , the British Army possessed two primary anti @-@ tank weapons for its infantry : the Boys anti @-@ tank rifle and the No. 68 AT Rifle Grenade . However , neither of these was particularly effective as an anti @-@ tank weapon . The No. 68 anti @-@ tank grenade was designed to be fired from a discharger fitted onto the muzzle of an infantryman 's rifle , but this meant that the grenade was too light to deal significant damage , resulting in it rarely being used in action . The Boys was also inadequate in the anti @-@ tank role . It was heavy , which meant that it was difficult for infantry to handle effectively , and was outdated ; by 1940 it was effective only at short ranges , and then only against armoured cars and light tanks . In November 1941 during Operation Crusader , part of the North African Campaign , staff officers of the British Eighth Army were unable to find even a single instance of the Boys knocking out a German tank .

Due to these limitations , a new infantry anti @-@ tank weapon was required , and this ultimately came in the form of the Projector , Infantry , Anti @-@ Tank , commonly abbreviated to PIAT . The origins of the PIAT can be traced back as far as 1888 , when an American engineer by the name of Charles Edward Munroe was experimenting with guncotton ; he discovered that the explosive would yield a great deal more damage if there were a recess in it facing the target . This phenomenon is known as the ' Munroe effect ' . The German scientist Egon Neumann , found that lining the recess with metal enhanced the damage dealt even more . By the 1930s Henry Mohaupt , a Swiss engineer , had developed this technology even further and created hollow charge ammunition . This consisted of a recessed metal cone placed into an explosive warhead ; when the warhead hit its target , the explosive detonated and turned the cone into an extremely high @-@ speed spike . The speed of the spike , and the immense pressure it caused on impact , allowed it to create a small hole in armour plating and send a large pressure wave and large amounts of fragments into the interior of the target . It was this technology that was utilized in the No. 68 anti @-@ tank grenade .

Although the technology existed , it remained for British designers to develop a system that could deliver hollow @-@ charge ammunition in a larger size and with a greater range than that possessed by the No. 68 . At the same time that Mohaupt was developing hollow @-@ charge ammunition , Lieutenant Colonel Stewart Blacker of the Royal Artillery was investigating the possibility of developing a lightweight platoon mortar . However , rather than using the conventional system of firing the mortar shell from a barrel fixed to a baseplate , Blacker wanted to use the spigot mortar system . Instead of a barrel , there was a steel rod known as a ' spigot ' fixed to a baseplate ,

and the bomb itself had a propellant charge inside its tail . When the mortar was to be fired , the bomb was pushed down onto the spigot , which exploded the propellant charge and blew the bomb into the air . By effectively putting the barrel on the inside of the weapon , the barrel diameter was no longer a limitation on the warhead size . Blacker eventually designed a lightweight mortar that he named the ' Arbalest ' and submitted it to the War Office , but it was turned down in favour of a Spanish design . Undeterred , however , Blacker continued with his experiments and decided to try to invent a hand @-@ held anti @-@ tank weapon based on the spigot design , but found that the spigot could not generate sufficient velocity needed to penetrate armour . But he did not abandon the design , and eventually come up with the Blacker Bombard , a swivelling spigot @-@ style system that could launch a 20 @-@ pound (9 kg) bomb approximately 100 yards (90 m) ; although the bombs it fired could not actually penetrate armour , they could still severely damage tanks , and in 1940 a large number of Blacker Bombards were issued to the Home Guard as anti @-@ tank weapons .

When Blacker became aware of the existence of hollow @-@ charge ammunition , he realized that it was exactly the kind of ammunition he was looking for to develop a hand @-@ held anti @-@ tank weapon , as it depended upon the energy contained within itself , and not the sheer velocity at which it was fired . Blacker then developed a hollow @-@ charge bomb with a propellant charge in its tail , which fitted into a shoulder @-@ fired launcher that consisted of a metal casing containing a large spring and a spigot ; the bomb was placed into a trough at the front of the casing , and when the trigger was pulled the spigot rammed into the tail of the bomb and fired it out of the casing and up to approximately 140 metres (150 yd) away . Blacker called the weapon the ' Baby Bombard ' , and presented it to the War Office in 1941 . However , when the weapon was tested it proved to have a host of problems ; a War Office report of June 1941 stated that the casing was flimsy and the spigot itself did not always fire when the trigger was pulled , and none of the bombs provided exploded upon contact with the target .

At the time that he developed the Baby Bombard and sent it off the War Office , Blacker was working for a government department known as MD1 , which was given the task of developing and delivering weapons for use by guerilla and resistance groups in Occupied Europe . Shortly after the trial of the Baby Bombard , Blacker was posted to other duties , and left the anti @-@ tank weapon in the hands of a colleague in the department , Major Millis Jefferis . Jefferis took the prototype Baby Bombard apart on the floor of his office in MD1 and rebuilt it , and then combined it with a hollow @-@ charge mortar bomb to create what he called the ' Jefferis Shoulder Gun ' . Jefferis then had a small number of prototype armour @-@ piercing HEAT rounds made , and took the weapon to be tested at the Small Arms School at Bisley . A Warrant Officer took the Shoulder Gun down to a firing range , aimed it at an armoured target , and pulled the trigger ; the Shoulder Gun pierced a hole in the target , but unfortunately also wounded the Warrant Officer when a piece of metal from the exploding round flew back and hit him . Jefferis himself then took the place of the Warrant Officer and fired off several more rounds , all of which pierced the armoured target but without wounding him . Impressed with the weapon , the Ordnance Board of the Small Arms School had the faults with the ammunition corrected , renamed the Shoulder Gun as the Projector , Infantry , Anti Tank , and ordered that it be issued to infantry units as a hand @-@ held anti @-@ tank weapon . Production of the PIAT began at the end of August 1942 .

There was disagreement over the name to be given to the new weapon . A press report in 1944 gave credit for both the PIAT and the Blacker Bombard to Jefferis . Blacker took exception to this and suggested to Jefferis that they should divide any award equally after his expenses had been deducted . The Ministry of Supply had already paid Blacker £ 50 @,@ 000 for his expenses in relation to the Bombard and PIAT . Churchill himself got involved in the argument ; writing to the Secretary of State for war in January 1943 he asked " Why should the name Jefferis shoulder gun be changed to PIAT ? Nobody objected to the Boys rifle , although that had a rather odd ring . " Churchill supported Jefferis claims , but he did not get his way . For his part Blacker received £ 25 @,@ 000 (equivalent to £ 973 @,@ 000 in 2016) . from the Inventions Board .

= = Design = =

The PIAT was 39 inches (0 @.@ 99 m) long and weighed 32 pounds (15 kg) , with an effective direct fire range of approximately 115 yards (110 m) and a maximum indirect fire range of 350 yards (320 m) . It could be carried and operated by one man , but was usually assigned to a two @-@ man team , the second man acting as an ammunition carrier and loader . The PIAT launcher was a tube constructed out of thin sheets of steel , and contained the trigger mechanism and firing spring . At the front of the launcher was a small trough in which the bomb was placed , and the spigot ran down the middle of the launcher and into the trough . Padding for the user 's shoulder was fitted to the other end of the launcher , and rudimentary aperture sights were fitted on top for aiming ; the bombs launched by the PIAT possessed hollow tubular tails , into which a small propellant cartridge was inserted , and hollow @-@ charge warheads .

To initiate firing the weapon the trigger mechanism , which was essentially just a large spring , had to be cocked , and to do this was a difficult and awkward process . The user had to first place the PIAT on its butt , then place two feet on the shoulder padding and turn the weapon to unlock the body and simultaneously lock the firing pin to the butt ; the user would then have to bend over and pull the body of the weapon upwards , thereby pulling the spring back until it attached to the trigger and cocking the weapon . Once this was achieved , the body was then lowered and turned to reattach it to the rest of the weapon , and the PIAT could then be fired . Users of a small stature often found the cocking sequence challenging , as they did not have the sufficient height required to pull the body up far enough to cock the weapon ; it was also difficult to do when lying in a prone position , as was often the case when using the weapon in action .

When the trigger was pulled , the spring pushed the firing pin forwards into the bomb , which ignited the propellant in the bomb and launched it out of the trough and into the air . The recoil caused by the detonation of the propellant then blew the firing pin backwards onto the spring ; this automatically cocked the weapon for subsequent shots , eliminating the need to manually re @-@ cock .

Tactical training emphasized that it was best utilized from a slit trench with surprise and concealment on the side of the PIAT team , and where possible enemy armoured vehicles should be engaged from the flank or rear . It was possible to use the PIAT as a crude mortar by placing the shoulder pad of the weapon on the ground and supporting it with a monopod , giving the weapon an approximate range of 350 yards (320 m) . The PIAT was often also used in combat to knock out enemy positions located in houses and bunkers .

Despite the difficulties in cocking and firing the weapon , it did have several advantages ; its barrel did not have to be replaced or require high @-@ grade materials that were expensive to produce , there was little muzzle blast that could give the user 's position away , and the size of the barrel meant it could accommodate relatively large calibre munitions . However , the weapon did have drawbacks . It was very heavy and bulky , which meant that it was quite unpopular with the British and Commonwealth troops who were issued with it . There were also problems with its penetrative power ; although the PIAT was theoretically able to penetrate approximately 100 millimetres (4 in) of armour , field experience during the Allied invasion of Sicily , which was substantiated by trials conducted during 1944 , confirmed otherwise . During these trials , a skilled user was unable to hit a target more than 60 % of the time at 100 yards (90 m) , and faulty fuses meant that only 75 % of the bombs fired detonated on @-@ target .

= = Operational history = =

The PIAT entered service with British and Commonwealth units in mid @-@ 1943 , and was first used in action by Canadian troops during the Allied invasion of Sicily . The 1944 war establishment for a British platoon , which contained 36 men , had a single PIAT attached to the platoon headquarters , alongside a 2 @-@ inch (51 mm) mortar detachment . Three PIATs were issued to every company at the headquarters level for issuing at the CO discretion - allowing one weapon for each platoon . British Army and Royal Marines commandos were also issued with PIATs and used them in action . The Australian Army allocated a PIAT (which was also known as Projector Infantry

Tank Attack in Australian service) to each infantry platoon in its ' jungle divisions ' , which differed from the standard British organisation , from late 1943 .

A contemporary (1944 ? 45) Canadian Army survey questioned 161 army officers , who had recently left combat , about the effectiveness of 31 different infantry weapons , in that survey the PIAT was ranked the number one most ? outstandlingly effective ? weapon , followed by the Bren gun in second place .

An analysis by British staff officers of the initial period of the Normandy campaign found that 7 % of all German tanks destroyed by British forces were knocked out by PIATs , compared to 6 % by rockets fired by aircraft . However , they also found that once German tanks had been fitted with armoured skirts that detonated hollow @-@ charge ammunition before it could penetrate the tank 's armour , the weapon became much less effective .

The PIAT was used in all theatres in which British and Commonwealth troops served , and remained in service until the early 1950s , when it was replaced by the American bazooka . The Australian Army briefly used PIATs at the start of the Korean War alongside 2 @.@ 36 @-@ inch (60 mm) bazookas , but quickly replaced both weapons with 3 @.@ 5 @-@ inch (89 mm) M20 " Super Bazookas " . As part of the Lend Lease agreement , between October 1941 and March 1946 the Soviet Union was supplied with 1 @,@ 000 PIATs and 100 @,@ 000 rounds of ammunition . The PIAT was also utilized by resistance groups in Occupied Europe . During the Warsaw Uprising , it was one of many weapons that Polish Underground resistance fighters used against German forces . And in occupied France , the French resistance used the PIAT in the absence of mortars or artillery . After the end of the Second World War , the Israeli Haganah used PIATs against Arab armour during the 1948 Israeli War of Independence .

Six Victoria Crosses were awarded to members of the British and Commonwealth armed forces for actions using the PIAT :

On 16 May 1944 , during the Italian Campaign , Fusilier Frank Jefferson used a PIAT to destroy a Panzer IV tank and repel a German counterattack launched against his unit as they assaulted a section of the Gustav Line .

On 6 June 1944 , Company Sergeant Major Stanley Hollis , in one of several actions that day , used a PIAT in an attack against a German field gun .

On 12 June 1944 Rifleman Ganju Lama of the 7th Gurkha Rifles used a PIAT to knock out two Japanese tanks attacking his unit at Ningthoukhong , Manipur , India (given as Burma in the official citation) . Despite sustaining injuries , Ganju Lama approached within thirty yards of the enemy tanks , and having knocked them out moved on to attack the crews as they tried to escape . When asked by his Army Commander , William Slim , why he went so close , he replied he was not certain of hitting with a PIAT beyond thirty yards .

Between 19 ? 25 September 1944 , during the Battle of Arnhem , Major Robert Henry Cain used a PIAT to disable an Assault gun that was advancing on his company position , and to force another three German Panzer IV tanks to retreat during a later assault .

On the night of 21 / 22 October 1944 , Private Ernest Alvia (" Smokey ") Smith used a PIAT to destroy a German Mark V Panther tank , one of three Panthers and two self @-@ propelled guns attacking his small group . The self @-@ propelled vehicles were also knocked out . He then used a Thompson submachine gun to kill or repel about 30 enemy soldiers . His actions secured a bridgehead on the Savio River in Italy .

On 9 December 1944 , Captain John Henry Cound Brunt utilised a PIAT , amongst other weapons , to help repel an attack by the German 90th Panzergrenadier Division .

= = Users = =

Some of the users of the PIAT included :

Australia
Canada
Free French Forces
Kingdom of Greece

India
Israel
Italy (Co @-@ Belligerent Army and partisans)
Luxembourg
New Zealand
Polish Underground
Soviet Union
United Kingdom
Yugoslavia
Malaysia