= Roper steam velocipede =

The Roper steam velocipede was a steam @-@ powered velocipede built by inventor Sylvester H. Roper of Roxbury , Boston , Massachusetts , United States sometime from 1867 ? 1869 . It is one of three machines which have been called the first motorcycle , along with the Michaux @-@ Perreaux steam velocipede , also dated 1867 ? 1869 , and the 1885 Daimler Reitwagen . Historians disagree over whether the Roper or the Michaux @-@ Perreaux came first . Though the Reitwagen came many years later than the two steam cycles , it is often , perhaps most often , known as the " first motorcycle " because there is doubt by some experts that a steam cycle meets the definition of a motorcycle .

After his initial prototype of the late 1860s , Roper built a new and revised version in 1884 , based on the then state of the art safety bicycle frame type . Sylvester Roper died of an apparent heart attack while riding this machine in 1896 .

An 1869 Roper machine is now in the Smithsonian Institution , and one from 1868 is in private hands after being offered at auction in 2012 . An 1894 Roper velocipede was exhibited in the Guggenheim Museum 's The Art of the Motorcycle show at their Las Vegas venue , and was shown in 2011 at the Deeley Museum collection in Vancouver .

= = First motorcycle ? = =

There are competing claims for the title of first motorcycle , depending on whether a steam motorcycle , or only one with an internal combustion engine , counts as a true motorcycle , and the uncertainty as to which of the two earliest steam motorcycles , the Roper or the Michaux @-@ Perreaux , was built first .

= = = Date = = =

The earliest date claimed for the existence of the Roper steam velocipede is 1867 , but some say the Michaux @-@ Perreaux also could have been made in 1867 . Motorcycling historians Charles M. Falco and David Burgess @-@ Wise , and Motorcycle Consumer News design columnist Glynn Kerr date the Roper later , to 1868 , and the Owls Head museum 's example is of that year . The AMA Hall of Fame and motoring author Mick Walker put Roper 's steam velocipede at 1869 , in accordance with the date of the machine in the Smithsonian . Cycle World 's Alan Girdler dates both at 1868 , while Mick Walker also declares a tie , but in the year 1869 . Classic Bike editor Hugo Wilson says the existence of an 1869 patent for the Michaux @-@ Perreaux gives it " the better claim to ' first ' " , even though the Roper was built around the same time . Though Sylvester Roper took out a number of patents for firearms , industrial machinery and other inventions , he did not obtain patents for any of his steam cycles or cars .

= = = True motorcycle ? = = =

If the definition of a motorcycle requires an internal combustion engine , as asserted by the Oxford English Dictionary and others , then the two pre @-@ 1870 steam cycles are disqualified and the first motorcycle may be Bernardi 's 1882 motorized tricycle , or the Reitwagen of Wilhelm Maybach and Gottlieb Daimler , patented in 1885 . Encyclopedia Britannica defines a motorcycle as , " any two @-@ wheeled or , less commonly , three @-@ wheeled motor vehicle , usually propelled by an internal @-@ combustion engine . "

A somewhat different argument acknowledges that while the several steam two- and three @-@ wheelers that preceded the Reitwagen might have been technically motorcycles , none are candidates for the historical milestone of " the first motorcycle " because the technology they used was a dead end . Instead , the recognition should go to the internal combustion Reitwagan because it blazed a trail that was followed by the thousands of successful motorcycles subsequently built in the 20th century . As Cycle World 's Technical Editor Kevin Cameron noted , " History follows things

that succeed , not things that fail . "

Allan Girdler and Glynn Kerr nonetheless still favor the Roper , even by Cameron 's criterion . The reason , they say , is that it did in fact pioneer successful motorcycle technologies , including the twistgrip throttle control , and the frame geometry and engine placement used by the motorcycle as we know it today , while the Reitwagen was exceedingly crude , failing to employ the well understood principles of rake and trail to remain upright by movements of the front fork , and turn by leaning . Rake and trail are created by having the steering axis angled to varying degrees , rather than perfectly vertical , and by having the steering axis slightly offset , creating trail . This subtle engineering makes it possible for the rider to turn the bicycle or motorcycle by the counterintuitive , and typically unconscious , technique of countersteering , in which the handlebar is turned slightly to the left , causing the machine to lean to the right , and turning the vehicle to the right . Trail , also called fork offset , is an element contributing to the stability of bicycle and motorcycle dynamics , and the lack of it was one reason why the Reitwagen had to rely on two outrigger wheels to keep it from falling down , so it remained vertical and was steered much like a tricycle . David Burgess @-@ Wise called the Daimler @-@ Maybach test bed " a crude makeshift " , saying , " as a bicycle , it was 20 years out of date . "

= = 1867 ? 1869 version = =

According to the Smithsonian , Roper 's first velocipede of 1867 ? 1869 used a purpose built frame rather than adapting an existing velocipede frame by retrofitting a steam engine , but one contemporary newspaper account does assert that Roper repurposed a velocipede frame , and Setright and motoring author Roland Brown say Roper used a hickory wood frame built by the Hanlon Brothers , who made and demonstrated boneshakers at fairs and circuses , although the Smithsonian 's Roper has an iron frame . It had a wheelbase of 49 in (1 @,@ 200 mm) and two 34 in (860 mm) diameter wheels made of iron bands on wooden felloes with wooden spokes . It had a rigid , forged iron fork , and a solid handlebar with wooden grips . Unlike the modern twistgrip , where the grip on only one side is a sleeve that rotates around the handlebar to open the throttle , the Roper velocipede 's entire bar was rotated with both hands , and it had a dual function . When turned forward , the throttle opened , and when turned backwards it applied the spoon brake on the front wheel . The seat doubled as the water reservoir ; or the water tank can be described as saddle shaped . A hand pump transferred water from this tank to the boiler . The boiler was between the wheels with a " nautical looking " chimney from the boiler angling backwards behind the rider , with the firebox in the lower half of this housing , all of which hung from the frame with a spring to absorb shock , while two stay rods attached the bottom of the housing to the back of the frame . There were three water level cocks on the left side , near the water pump , and a drain valve on the bottom . The two cylinders , with bores of about 2 1 ? 4 in (57 mm) were located on either side of the frame , from the upper part of the boiler near the chimney , connecting to 2 1 ? 2 in (64 mm) cranks on the rear wheel . Exhaust steam , conveyed by tubing to the base of the chimney , provided a forced draft .

The original 1868 version of the velocipede is attributed to W.W. Austin of Winthrop , Massachusetts by some early newspaper accounts , which were taken up in later histories . Motoring author L. J. K. Setright believes Austin was only the rider or demonstrator of a Roper machine , and had been misidentified as its inventor . Austin is also mentioned as the owner , in 1901 , of both the 1867 ? 1869 Roper velocipede and an older four wheeled Roper steam car . The Smithsonian says a " Professor " W.W. Austin had exhibited a Roper steamer of unknown date , leading to the erroneous attrition to Austin instead of Roper . A Roper velocipede was on display at the first New York Auto Show in Madison Square Garden in November 1900 , and again Austin was sometimes described as the inventor .

The 1867 ? 1869 Roper velocipede , or one like it , was later given to the Smithsonian by John H. Bacon , and is currently in the America on the Move exhibit in the National Museum of American History , Washington , D.C. It is the oldest self @-@ propelled road vehicle in the Smithsonian , and the second oldest in America , after the Dudgeon steamer .

= = 1884 ? 1896 version = =

Roper 's second steam cycle was apparently constructed in 1884 , and was further developed in 1896 , when Colonel Albert Pope , owner of Pope Columbia bicycles safety bicycle , commissioned Roper to build a ' pacer ' for his bicycle racing team , . Motorized bicycle pacers had recently emerged with crude deDion @-@ based gasoline engines , but these were unreliable and often disappointed racing fans . Pope supplied a Columbia frame to Roper , who added an improved single @-@ cylinder coal fired steam engine to the center of the frame . The weight , including coal and water , was 150 lb (68 kg) . The steam engine normally generated 150 pounds of steam pressure , but could go as high as 185 pounds , which the Boston Daily Globe in 1896 described as equivalent to 8 hp (6 @.@ 0 kW) . Roper was known to regularly ride this machine , which he called his ' self propeller ' , from his home at 299 Eustis Ave in Roxbury to the Boston harbor , a distance of 7 miles , the engine 's maximum range . Roper claimed his machine could ' climb any hill and outrun any horse ' , and American Machinist magazine noted , " the exhaust from the stack was entirely invisible so far as steam was concerned ; a slight noise was perceptible , but not to any disagreeable extent . " .

Roper was asked to demonstrate his ' self propeller ' at the Charles River velodrome , a banked concrete bicycle racing track , where he first paced the racing cyclists , then raced professional rider Nat Butler , easily outpacing the bicyclists with timed laps at around 30 mph (120.2sec / mile on the 1 / 3mile track) . He was then encouraged to give a demonstration of maximum speed , and was timed at over 40 mph , when a ' sudden pallor ' was ween on his face , and his machine wobbled to a stop , Roper falling off his cycle . He died at the track @-@ side with his son Charles , of ' natural causes ' , at age 72 .

This machine was on exhibit in the 1960s at Bellm 's Cars of Yesterday in Sarasota , Florida . An 1894 Roper velocipede was lent from the R. J. Boudeman family collection to the Solomon R. Guggenheim Museum 's 2001 expansion , Guggenheim Las Vegas , where The Art of the Motorcycle exhibition was the only show there until the expansion closed in 2003 . It was the fourth venue for the motorcycle design show which had first opened at the Guggenheim New York in 1998 , where the Michaux @-@ Perreaux velocipede had been the first machine viewers saw upon entering the rotunda of the museum . Later , the Boudeman Roper velocipede was on view at the 2011 Deeley Motorcycle Exhibition in Vancouver . An 1894 Roper was offered for auction in January 2012 , with a claimed high bid of $ 425 @,@ 000 .