Chas W Harrison





AMERICAN BICYCLE COMPANY AUTOMOBILE DEPARTMENT

TOLEDO FACTORY

TOLEDO OHIO



STEAM CARRIAGES.

OFFICE & SHOW ROOM, 806 WEST 59th STREET, NEAR THE CIRCLE.



American Bicycle Company,

AUTOMOBILE DEPARTMENT,

Toledo Factory. TOLEDO, OHIO.

1900-1903

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November 1, 1901,
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Automobile Department,
Toledo Factory,
Toledo, O.

INTRODUCTION.

PERHAPS no sport or industry has had attracted to it during the past year so much attention from an interested public as has that of the automobile. Now that it has passed beyond the bounds of a few early enthusiasts to whom much credit is due for its in roduction, and received the approval of a large class, who, in keeping with the spirit of the times, have not been slow to recognize the countless advantages of this humanitarian form of travel, it is not to be doubted the coming season holds in promise a still greater interest in this most delightful pastime.

Fortunately for the enduring future of the automobile, it may be said that the great practical development of the vehicles has done everything to meet the expectations of many who may have heretofore hesitated in the thought that the automobile thus far was merely a new means of enjoyment for a chosen few. How readily such an opinion can be dispelled is admitted by close

observers of the practical progress made.

In considering the class of vehicle suitable for American roads, every condition, even to the popular demand for a low priced carriage, received our most careful study. To the fact that we did not heed this latter demand, to the exclusion of more important questions, but instead settled upon the determined purpose of building the best which the highest engineering skill, backed by a high grade factory, manned by skilled workmen, could produce, is due the success of the Toledo to-day.

That the Toledo is a practical success is amply attested by the many satisfied users, who, after a season's experience, are manifesting their satisfaction by introducing the Toledo to the favorable

attention of their friends.

The wide range of usefulness to which the Toledo can be put, between business and pleasure, with profit to the user, is at least

worthy of investigation.

To those desiring a carriage for pleasure driving, in jaunts through the country, to the golf links, or sea side, it will prove a most delightful and certain means of transportation. As the elasticity of steam permits of any variation of speed, without (as arranged in the Toledo) any conscious effort, ample opportunity is given the operator and companion to view the ever changing landscape, in passing through some beautiful country.

For city and business or professional use, no type of motive power is so well adapted. The physician to-day is making practical use of the Toledo in his daily round of calls, as the pilot light and automatic regulator permit of the carriage standing for hours at the curb, steam up and ready for instant use, at an infinitesimal cost for

fuel.

FACTORY AND METHODS.

It is not expected that the prospective purchaser of an automobile is going to make a selection before first learning something about the factory and methods employed in its development and production. Nothing is welcomed so much by the makers of the Tolcdo, as a thorough investigation on these two points. It is, at all times, a pleasure to admit visitors to the works, no departments being closed to inspection. To those who may not be able to avail themselves of this opportunity, a few words on the subject of "Factory and Methods" may not be out of place.

To drop for the moment into statistics, we will state that the Toledo factory, in extent, covers 5 acres, and has a floor space of 249,000 square feet, thus making it easily the largest factory in the world devoted solely to the manufacture of automobiles. That so much capital has been invested, and only the best of talent employed, is at once ample assurance of faith in the character of the product, and a belief in the prompt recognition by the public of a superior

steam vehicle.

In this plant is installed only machinery of the highest grade and latest type, as the high standard set for the Toledo could, by no other means, be reached. So jealous are the makers of the good reputation already gained, that the policy of controlling all of the special and exclusive features in its construction, and which have contributed so largely to its success, will be adhered to. Probably nothing is so convincing of our earnest desire to make the production of the very best our one sole aim, than the fact that, with the exception of tires, lamps, bells, cyclometers, gauges and springs, we make everything entering into the construction of the Toledo.

In the choice of materials and accessories, only the best and most suitable for each part is used, and can enter only after the

most rigid inspection.

INSPECTION.

Close inspection does not end with the purchase of the best raw materials the market affords, as the system extends throughout each department, and works progressively. Supplementing this inspection, comes the process of testing running parts, such as the

engine, and also boiler, before assembling.

To crown all, each Toledo is then given a most searching test on the road of, at least, 50 miles; and, until a certain high standard is reached, as shown on the certificate of each vehicle, none will be passed to the final finishing room. Here the test wheels and seat are removed, and the new parts, which require no testing, are added. The final finishing varnish is applied, and the carriage then only becomes ready for shipment.

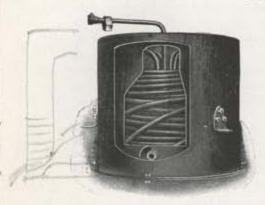
If a pride is naturally felt in the finished Toledo, we believe it is quite pardonable and fully justified. We believe its like in high grade construction, finish and upholstery does not exist here or

abroad to-day.

As a matter of interest to those who care to go deeper into details, it will be our pleasure to dissect the construction of the Toledo for their, and, we trust, our mutual benefit.

FACTORY STORY.

BOILER.



In the construction of a steam carriage, one of the most vital points to be determined is the type of boiler to be used. Bearing in mind that even at this late date some timidity is still felt by a portion of the public on the question of safety too much attention cannot be given to this all important point, for it is only with the knowledge the purchaser has, that the factor of safety has been made abnormally

large, that true enjoyment is possible.

The mere question of boiler strength and safety is one, however, calling for no particular amount of engineering skill, and is a condition which we believe is successfully met by many of the reputable makers of steam vehicles to-day. Other requirements of really far greater difficulty have had to receive the study of the best engineering talent obtainable, and followed up by experiments and severe tests in actual service.

When the Toledo was determined upon as a model worthy of our own efforts and public support, it was realized that if a lasting reputation was to be our reward, something essentially different and improved over the copper fire tube boiler would be required. This type served its purpose among the pioneer products in the steam vehicle field, but, like many other devices, has been since superseded by later inventions and improvements. Undoubtedly nothing has done so much to bring the fire tube boiler into disrepute as its constant tendency, under the slightest inattention, to burn out. Bearing this fact in mind, the designers of the Toledo have brought out an entirely new type of water tube boiler which is a happy combination of the shell and flash type generators. It has all the advantages of the flash type in its ability to generate steam rapidly, combined with the advantage of the shell type in having great capacity to draw upon. The general construction of this boiler can be seen at a glance by noting the illustration above. While this gives the purchaser an idea as to the construction, it does not show two very unique features which enter into the make up of the boiler. First, that of a centrifugal separator within the shells, and,

secondly, the addition of a superheating coil, the upper end of which is shown in the illustration.

The centrifugal separator causes the entire body of water contained between the walls, formed by the inner and outer shells, to artificially circulate. The question then arose with the designers, "How shall we take advantage of this rotary movement and increase the circulation in the steaming tubes?" This was accomplished by placing small dams in direct line with this circulating water, which act as scoops, and throw the water directly into the tubes. One of these can be seen in the illustration of the boiler.

Another valuable feature in this boiler is the mud settling drum, or space below the line of the fire action where dirt may be precipitated. Means are provided for blowing off the boiler at its lowest point, thereby emptying all water in precipitated matter.

In the point of safety it has all the advantages so well known to water tube types Every boiler is tested to a cold water pressure of 600 pounds. This does not represent its limit of strength, as it will take 1,200 pounds without undue stress. This gives the purchaser ample protection, as the factor of safety is six.

On the score of capacity and economy scientific tests have been conducted by mechanical engineers which show that this small boiler is as economical in evaporative efficiency as any large type water tube boiler found in advanced stationary practice.



BURNER.

In point of operation it might be said that the Toledo burner is provided with a pilot light, which, after once being lighted, maintains a steady, small flame irrespective of the regulator. The regulator acts on the main burner, and either cuts out or admits gas to it automatically. The automatic regulator action is such that steam being

raised to within a few pounds of a predetermined pressure the flow of gasoline is cut off. Should the carriage be started and this pressure reduced, the regulator will again admit the gas to the burner, which is ignited by the small pilot light referred to above, and, in this way, the steam pressure is again raised to the cutting off point of the regulator. So efficient is this combination of pilot light and main burner that repeatedly steam has been raised up to

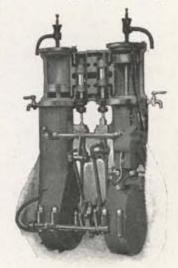
150 pounds from cold water in five minutes, which time is very creditable in view of the size and capacity of the Toledo ba ler.

It might be added that the air injector tube leading to the burner has been designed after having made a number of experiments and by data obtained from Rear Admiral George W. Melville, Engineer in Chief of the United States Navy. The results have shown that we have been enabled to produce a degree of combustion which is far ahead of anything that has been done along this line.

ENGINE.

To complete the description of the power plant installed in the Toledo it is necessary to say something regarding the engine and feed water heater. The engine is of the ordinary reciprocating

type, having two high pressure cylinders, 3-inch in diameter and 4-inch stroke. Unlike other makers of automobile engines, we have adopted the balance piston valves which are to-day giving splendid satisfaction in our machines. The pistons themselves are each provided with two ordinary spring rings, such as are commonly used in standard steam engine building. The cross-heads are made of phosphor bronze, and, after having figured out the correct size according to standard formulas, 150 per cent. was added to the bearing surface, This gives a cross-head which will run indefinitely without wear. The lubrication of this engine is obtained



by the cranks dipping in baths of oil. This lubricates the crank pin, main bearing and the slides. The connecting rod, as shown in the cross-head illustration, is made of a steel forging with a marine head, and the crank end is built solid, and here again a wearing surface is provided which is 150 per cent. large. Should this part show the slightest signs of wear, the whole can be taken care of by two small bushings, which cost but a few cents, and the slipping of them in place makes an absolutely perfect adjustment, easily accomplished by the ordinary operator of an automobile.

We wish also to call attention to the fact that on the crank end of the rod, a scoop is provided, which dips into the oil bath at every revolution and throws oil on to the crank bearing, therefore, it is impossible, as long as there is a bath of oil present, to run these bearings dry.

The cranks, eccentrics and sprockets are all drop forged steel, and are hardened and tempered.

So carefully has this little engine been constructed, produced and assembled, that, in conjunction with the boiler already described, we have been able to produce a horse power with 24 pounds of water per hour. These figures will be recognized by those knowing their meaning as an exceptionally high efficiency for a power plant so small, but the results have been obtained, and we are ready at any time to reproduce them at our factory.

This engine has attached to it a boiler feed pump which obtains its supply from the rear tank, and, after pumping through the feed water heater, which is combined with our special muffler, a temperature is reached of 208 degrees. So efficient is this device that the economy resulting in its adoption has an effect of producing a saving of 15 per cent, in the fuel consumption.

Repeated road trials have shown that in point of mileage radius we are able to run 85 miles on 9 gallons of gasoline, and 35 miles on 31 gallons of water, over ordinary country roads. When the weight of the vehicle, which is 1,500 pounds, is taken into consideration, it will be seen that the Toledo surpasses in economy the results obtained in the very lightest carriages produced.

AUTOMATIC AIR PUMP.

The engine is also equipped with an automatic air pump of simple design and construction, which, by a simple adjustment, maintains an air pressure automatically of any desired amount without further attention of the operator. Unlike most automatics, the very simplicity of the Toledo air pump guarantees reliable action, as complexity in construction has been strictly avoided.

AUXILIARY PUMP.

In addition to the feed water pump attached to the engine, an auxiliary feed water pump of our own patented design has been adopted, and is located at the base of the steering lever, thus making it very convenient for the use of the operator in case of a failure of the regular power pump to operate, which is sometimes occasioned by carelessness in allowing dirt to get into the water tank.



STEERING KNUCKLE.

Also in connection with the steering lever auxiliary water pump will be found a non-vibrating steering knuckle, for destroying vibration, which makes center steering a pleasure. The handle is fixed rigidly to the box and moves with it constantly, the ball and socket knuckle joint accommodating itself to the inequalities of the road surface without communicating any of the vibration to the handle.

MUFFLER.

The muffler used on the Toledo is of a new design, and built on scientific principles. As stated, in it we combine the functions of a feed water heater. This muffler is illustrated in section, and is situated in combination with the boiler about four inches above it. In this way waste gases from the boiler pass under the muffler and out, thus helping to render the exhaust steam invisible.

The feed water coil which is placed in the muffler comes into

contact with the exhaust steam, and, in this manner, the supply of water going to the boiler is heated.

SIPHON.

Another feature which has been added is the water tank siphon, by the use of which the operator is enabled to quickly attach the hose, which is supplied with each carriage, and, dropping the end provided with a strainer into some way-side stream or corner watering trough at a country inn, can, by opening a valve, fill the water tank in about half the time required by the laborious method of carrying a bucket. The siphon is illustrated herewith, and as will be seen, is extremely simple, no complicated mechanism being used which would be



likely to get out of order. The siphon is attached to the rear right hand corner of the 30 gallon copper water tank, which latter is also provided with strainer and flusher for cleaning out.

SINGLE THROTTLE AND REVERSE LEVER.

The control of the carriage should, at all times, be simplicity itself. After a good deal of consideration it was decided to control both the forward and reverse movements of the Toledo with a single lever. In doing this we have sacrificed nothing in economy and have gained materially in the manageability of the carriage, adding greatly to the pleasure of operating. The engine, chain and axles are so stoutly designed that the instantaneous reversing of the engine, when at full speed, does not in the least disturb the mechanism, it all having been designed for just this very service. One does not realize the advantage of this controlling system until he has endeavored to run through the crowded traffic in some of our large cities. Here the arrangement proves without question far superior to any device which has yet been produced for controlling steam automobiles.

SIZE OF FRAME TUBE AND CONSTRUCTION.

Considering the work which a carriage of the character of the Toledo has to do, strict attention has been paid to the design of the running gear and body. All strains have been amply provided for. The gear is composed of seamless drawn Hercules steel tubing, 134-inch in diameter, varying in gauge from 16 to 8, in accordance with the strains it has to withstand in meeting practical conditions on the road.

The differential gear is completely encased and protected from entrance of dirt. It is provided with 5 bevel pinion gears and two master gears, both of which mesh with the aforesaid five gears, thus assuring a true relation, one with the other, at all times.

BRAKE.

The brake is so devised that with the ordinary pressure of the foot, the carriage can be held stationary on the steepest grades. All brake parts are strongly constructed, as it is realized that the safety of the driver depends largely upon this attachment.

BODY CONSTRUCTION.

In the construction of the carriage body hard woods and metal both enter. The former is of the best selected second-growth ash and hickory. Metal is used in the dasher, side and rear panels, and also a rolled plate covering the top of the box. In this way a light, strong body is secured which meets all the demands of an ideal automobile body.

GASOLINE AND AIR TANKS.

The gasoline tanks used in the Toledo are made from copper, tested to 200 pounds pressure, and are two in number, containing 4½ gallons each.

The air tank is also of copper and is likewise tested to 200 pounds pressure.

WORKMANSHIP AND FINISH.

Nothing so well attests the character of the work put in a carriage as the assembled finished product, ready for the customer. It is here that critical inspection reveals whether methods and designs have been faulty. It is with no small pride that we point to the finish of the Toledo as a triumph of the motor vehicle art to-day, and feel confident in challenging the most rigid inspection of the public, and particularly those skilled in the art, that a favorable opinion will be the verdict. No expense or time has been spared to make the finished Toledo the peer of any in point of beauty of design, superior workmanship, and finish. In respect to capacity and strength it is absolutely unrivaled. These results could not be achieved were it not that, as stated before, the control of all the parts manufactured for this carriage is in our own hands, we making everything here but six minor accessories, which are purchased from the best makers in their respective classes. The highest engineering skill has been employed in the production of the Toledo, and we are confident that the result will justify the time and expense lavished in the production of this latest and best of steam vehicles.



SPECIFICATIONS.

Model A.

Price, - - \$900

Engine.-Oil encased, 3 in. x 4 in. piston valves.

Boiler .- Water tube.

Burner .- 19 in., with pilot light attached.

Water Tank .- Copper, holding 31 gallons.

Gasoline Tanks .- Two, of copper, holding 41/2 gallons each.

Air Tank.-Copper, tested 200 pounds pressure.

Water Pump.-New design, attached to engine cross head.

Air Pump.-New design, automatic, attached to engine cross head.

Hand Water Pump .- In combination with steering lever.

Throttle Lever .- In combination with reverse lever.

Steering Lever .- Non-vibrating, center steering.

Gear.—Best seemless tubing, 134 inches diameter.

Wheels .- 28 inches, wire, nickeled spokes and hubs.

Tires .- 28 inches by 3 inches, single tube.

Upholstering.—Best grade hand buffed leather, solid panel seats.

Accessories.-Lamps, bell, cyclometer, lock for throttle and tools.



SPECIFICATIONS.

Model B.

Price, - - - \$1,000.

Engine.-Oil encased 3 in. x 4 in., piston valves.

Boiler .- Water tube.

Burner .- 19 in. with pilot light attached.

Water Tank .- Copper, holding 31 gallons.

Gasoline Tanks .- Two of copper holding 41/2 gallons each.

Air Tank.-Copper, tested 200 pounds pressure.

Water Pump.-New design, attached to engine crosshead.

Air Pump.—New design, automatic, attached to engine crosshead

Hand Water Pump .- In combination with steering lever.

Throttle Lever .- In combination with reverse lever.

Steering Lever .- Non-vibrating, center steering.

Gear.—Best seamless tubing 134 inches diameter.

Wheels .- 28 inches, wire, nickeled spokes and hubs.

Tires.-28 inches by 3 inches, single tube.

Upholstering.—Best grade hand buffed leather. Solid panel seats.

Buggy Top-Strictly first class hand buffed leather, with storm apron.

Accessories .- Lamps, bell, cyclometer, lock for throttle and tools.



SPECIFICATIONS.

Model C.

Price, - - \$1,600.

Engine.—Oil encased 3 in. x 4 in., piston valves.

Boiler .- Water Tube.

Burner.-19 inch, with pilot light attached.

Water Tanks.-Copper.

Gasoline Tanks.-Two of copper holding 41/2 gallons each.

Air Tank.—Copper, tested 200 pounds pressure.

Water Pump.—New design, attached to engine crosshead.

Air Pump.-New design automatic, attached to engine crosshead.

Hand Water Pump. - In combination with steering lever.

Throttle Lever .- In combination with reverse lever.

Steering Lever .- Non-vibrating, center steering.

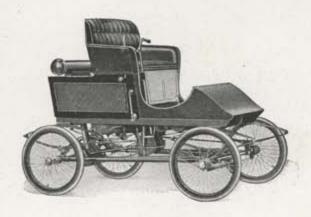
Gear .- Flexible, 134 in. diameter, best seamless tubing.

Wheels .- 30 in., wire, nickeled spokes and hubs.

Tires .- 30 in. x 4 in. single tube.

Upholstering.—Best grade hand buffed leather. Solid panel seats.

Accessories.—Lamps, bell, cyclometer, lock for throttle and tools.



SPECIFICATIONS

Model D.

Price, - - \$1,100.

Engine.—Oil encased, 3 in. x 4 in. piston valves.

Boiler .- Water tube.

Burner .- 19-inch, with pilot light attached.

Water Tank .- Copper, holding 31 gallons.

Gasoline Tanks .- Two of copper, holding 41/2 gallons each.

Air Tank .- Copper, tested 200 pounds pressure.

Water Pump.-New design, attached to engine crosshead.

Air Pump.—New design, automatic, attached to engine crosshead.

Throttle Lever .- In combination with reverse lever.

Steering Lever .- Side steering.

Gear.-Flexible, 134 in diameter, best seamless tubing.

Wheels.-28 inches, wire, nickeled spokes and hubs.

Tires.—28 inches by 3 inches, single tube.

Upholstering.—Best grade hand buffed leather. Solid panel seats.

Accessories.-Lamps, bell, cyclometer, lock for throttle and tools.

Model E-Same as Model D, but with buggy top added, \$1,200

In recognition of the demand for a vehicle which would combine with luxurious travel the capacity to store luggage, our Model D has been produced. By reason of our combining in this machine our new patented flexible gear, we are giving to the Model D Toledo a wide range of action in passing over obstacles encountered in the road service. In addition to this the wheel base of this model has been lengthened 6 inches, all of which contributes to ease and comfort in riding over rough country roads.

In the effort to provide some place for luggage, appearance has not been overlooked, and we are confident that advanced opinion will favor this new design as being entirely in harmony with the modern conception of the Automobile. The appearance of the vehicle will appeal at once to those who admire the display of taste and refinement in vehicle construction. The new model is built in keeping with the high grade standard that has marked the construction of all Toledo vehicles, the endeavor being to improve wherever possible upon the lines which had been laid down as giving the most satisfaction to the Automobile buying public, both from an artistic and comfortable standpoint.

It is presented to the public with the belief that it will undoubtedly win many admirers. There has long been a demand for just such a type of carriage and we believe the Toledo Model D will more than satisfy the wants of those who have expressed the desire to see just such a type of vehicle.



TERMS.

One-third cash with order; balance cash, f. o. b., Toledo, Ohio, when carriage is ready to deliver.

Remittances should be made by exchange on New York, or by Express Money Order. All correspondence from points outside of New York City should be addressed to American Bicycle Company, Automobile Department, Toledo Factory, Toledo, Ohio. American Bicycle # Company.

> Automobile Department Toledo Factory Toledo, Ohio

NEW YORK OFFICE: 91 Fifth Avenue.