THE BITRICYCLE, A FRENCH INVENTION.

We illustrate herewith a curious French invention, more on account of its unique character, than from any belief in the merit of the device. Our object also is to arouse the attention of inventors to the fact that there is still much room for improvement in construction of vehicles designed either for passengers, or the transport of wares and heavy materials for building and other purposes.

An attempt has been made in the construction of the "bitricyle" to secure immunity from overturning by broadening the base of the vehicle to such a degree that the center of gravity can in no instance fall outside of the base, and this is undoubtedly secured. The increased width of the vehicle resulting in the attainment of the above object, is an inconvenience for city travel, on account of the crowded state of the thoroughfares.

One smiles to think what a delightful snarl a crowd of these vehicles would produce in *any* of our New York thoroughfares, not to mention Broadway.

But an attempt has been made to carry out a correct principle in throwing the bulk of the weight upon wheels of very large size. It is well known that such wheels entail less work than small ones in proportion as roads are rough. With perfectly smooth and hard roads, perfectly round and inelastic wheels of different sizes would manifest no difference in draft, all other things being equal.

The plan of putting the large wheels in the center of the vehicle appears to us a very unmechanical contrivance, as it is manifest that on uneven surfaces the weight must be more or less unequally divided between the wheels—and it is easy to conceive of circumstances, in which only two of the wheels, or even the one central wheel on each axle, should temporarily bear all the load. The use of springs can only compensate for this irregularity to a certain extent; beyond that, we judge the rolling of this vessel upon her central wheels, over a rough road, would be something remarkable.

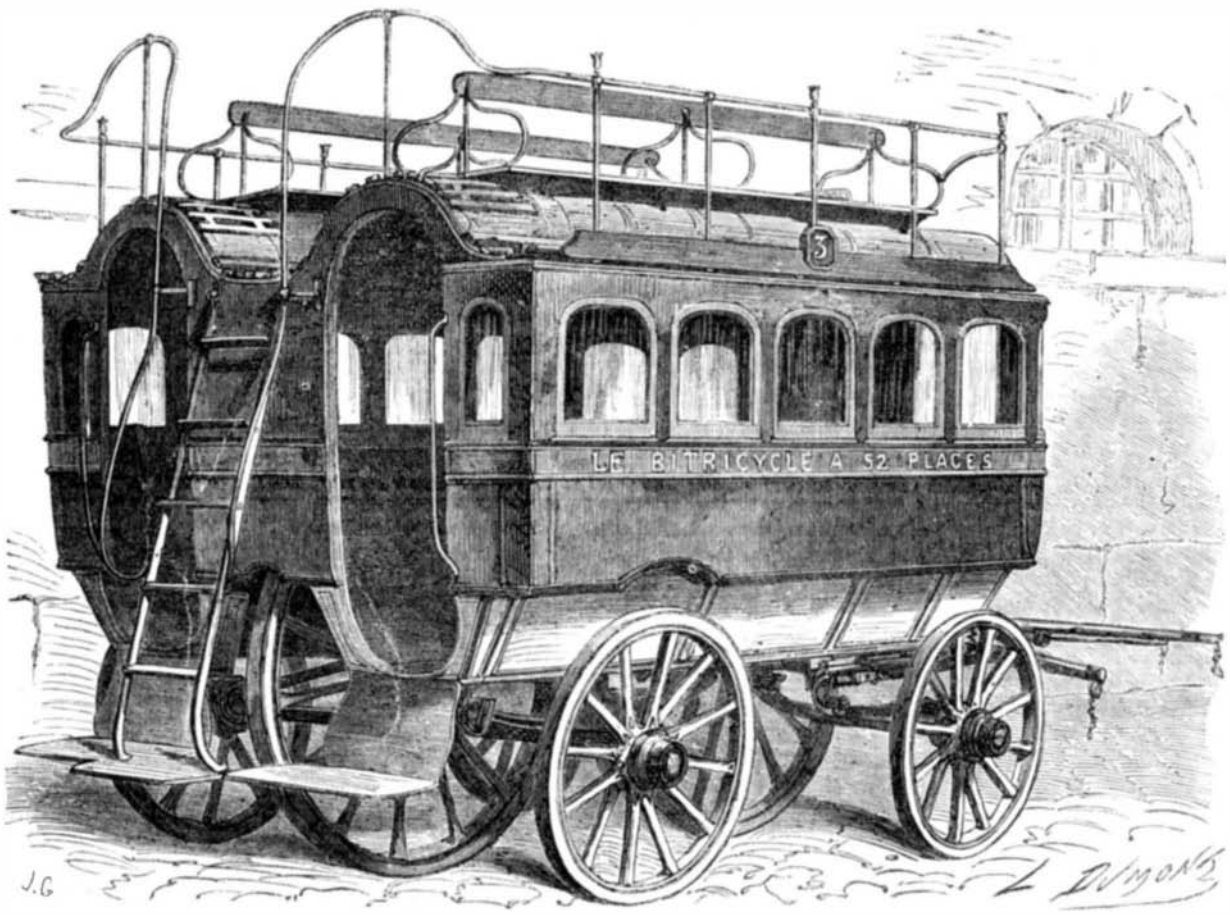
The inventor of this curious vehicle seems to have forgotten that immunity from overturning may be secured by lowering the center of gravity with a given width of base, as by widening the base while keeping the center of gravity at the same hight.

For all heavy draft vehicles, we believe that the hind wheels might be made much larger than at present is the case, with advantage; provided the construction of the vehicle is such as to throw the weight of the load mostly upon the larger wheels. The use of crank axles with such wheels would let down the body sufficiently to admit of easy loading.

We have seen this construction adopted for trucks used in moving heavy iron castings, blocks of stone, etc., with unquestionable advantage, and economy of labor, both to man and beast, yet for city trucking and farm work the high box or platform still prevails.

Of course the enlargement of the fore wheels cannot be carried beyond a certain point, on account of the resulting incapacity to turn shortly, a prime essential to a city truck; but it appears to us that the combination to be sought in the improvement of draft vehicles is the lowering of the load and the enlargement of the wheels.

In omnibuses likely to be run into by other vehicles, it seems necessary to raise the body so as to be in some measure out of the reach of injury from the contact of trucks, etc., which might endanger the passengers should they strike the body of the vehicle.



THE BYTRICYCLE.

The vehicle we illustrate is made to carry fifty-two persons inside and out, the inside being divided into two compartments, as shown. A canopy, or awning, in hot and in wet weather, is used to shelter the outside passengers.

THE BESSEMER PROCESS UNDER PRESSURE.

Our readers, who have read the article on page 184, current volume, SCIENTIFIC AMERICAN, entitled "A Visit to a Steel Manufactory," and who have felt sufficient interest in what is known as the Bessemer process, to have become familiar with its details, will at once understand the working of the improvement of which we give an engraving, and which has just been patented by Mr. Bessemer in the United States.

It has been found that when certain kinds of iron are treated after the Bessemer method the degree of heat attained upon the influx of air into the converters is very much inferior to that produced when other kinds are worked.

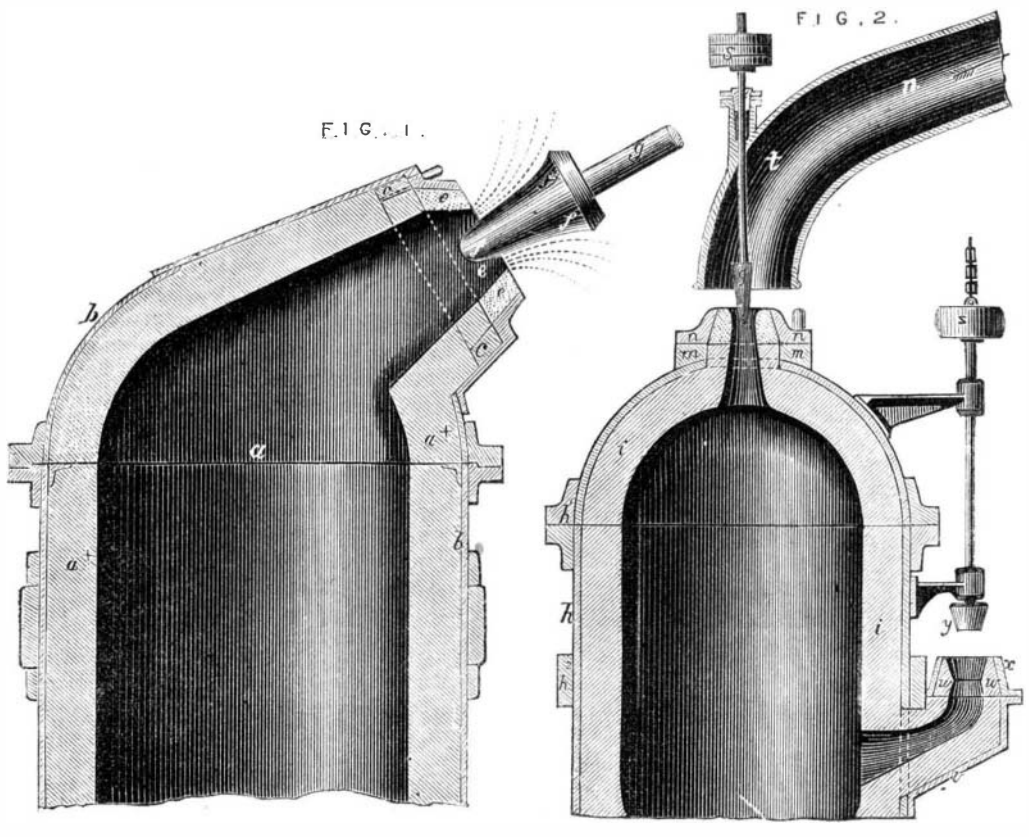
The object in the present invention is to force the air into the converters under pressure, and thereby to secure a greater volume of oxygen to support the combustion than is done in the ordinary way. The purer qualities of pig iron are advantageously worked in this way. In the old process the degree of heat obtained, when Swedish charcoal pig iron and some other varieties were worked, was insufficient to maintain fluidity in the mass until it could be poured into the ingot molds. Hence, a portion becoming hard gave rise to the formation of shells or "skulls"—as they are called—in the casting ladles. When malleable scrap or steel in solid state is worked with pig iron this evil is greatly increased.

The engraving which we copy from *Engineering* is accompanied with the following detailed description. Perhaps no invention of modern times illustrates better the fact that simplicity of construction may often secure the greatest advantages. This simple device of Mr. Bessemer is said to totally obviate the difficulty we have specified.

"Mr. Bessemer makes the converting vessel of great strength, securely riveting and caulking all the laps and joints so as to render it air tight as near as may be, and he, by preference, forms the mouth of the vessel circular instead of oval, and of a smaller size than usual, lining the mouth with a single ring of well-burnt fire clay, or composition of clay and plumbago. He also forms the metal part of the mouth of the converter with a movable dovetailed flanged ring, so that the fire-clay mouth of the vessel may be readily taken out and renewed, by unbolting or uncottering the iron ring which retains it in place.

"In the annexed engravings; Fig. 1 is a vertical section of a Bessemer converter constructed on this plan, *a* being the upper part of the converting vessel; a^x the lining of ganister, and *b* the strong riveted iron shell or vessel on the inside of the mouth of which the iron hoop, *c*, is riveted; while *d* is a flanged iron ring beveled on the inside, and secured by screwed studs or cotter bolts to the hoop, *c*. A molded ring, *e*, of fire brick or other suitable refractory material, forms the escape opening or mouth of the vessel; it is retained in place by means of the flanged ring, *d*, and when it is worn out or damaged the ring, *e*, may be renewed by unfastening the ring, *d*; a mixture of fire clay and ganister being first smeared over those parts of the ring, *e*, which come in contact with the lining, *a**, and with the beveled interior of the ring, *d*, for the purpose of making the joint air-tight.

"The aperture in the movable mouth of the vessel thus formed may in some cases be made small enough to retain the gaseous products, resulting from the combustion of the carbon or other matter contained in the pig iron, under a pressure much above that of the surrounding atmosphere, so that the combustion going on in the converting vessel may be under "high pressure," as described in our account of Mr. Bessemer's new melting furnaces, which appeared on pages 187 and 197 of our last volume. The contraction of the mouth of the vessel would in this case be greater than is shown in Fig. 1 for the purpose of retaining the gaseous products under considerable pressure, so that the gaseous products resulting from the combustion of carbon and other matters in or among the fluid metal would be prevented from expanding freely, and by reason of the combustion so taking place under a pressure much greater than that of the external atmosphere a more intense heat would be produced and imparted to the metal.



THE BESSEMER PROCESS UNDER PRESSURE.

"The amount of pressure thus obtained should vary with the heat-producing properties of the carburet of iron operated upon and the quantity of scrap or other unfused metal forming part of the charge, so that no precise rule can be laid down as to the pressure to be employed; but as a guide to the workmen, Mr. Bessemer states that for the conversion of the purer kinds of Swedish charcoal pig iron, and for mottled or white hematite pig iron mixed with gray, a back pressure in the vessel from 8 to 15 lbs. on the square inch will give good results, and in but few cases will a pressure of 20 lbs. per square inch be necessary; while a pressure as low as 3 or 4 lbs. will be of but little practical advantage, and below 2 lbs. per square inch he lays no claim to, as a useful effect. It will be understood that the pressure of the blast of air forced into the converting vessel must be increased in proportion to the back pressure caused by the penning up of the gases within the vessel.

"Mr. Bessemer, however, remarks that the mode of obtaining the required back pressure by simply diminishing the outlet, does not offer all the desired facility of regulating the pressure from time to time during the process, while at the same time the accumulation of slags in the aperture may in some cases reduce the area of outlet so much as to retard the inflow of air through the tweers. For these several reasons the opening in the mouth of the converting vessel may be made much too large, if left open to retain the gaseous matters in the converter at the high pressure desired; such larger sized mouth being provided with a conical stopper inserted in the opening, and so arranged as to be advanced or further withdrawn by being itself movable or by the motion of the vessel on its axis, the vessel being made to advance towards or recede from a fixed conical