CALCULATIONS AND REMARKS, TENDING TO PROVE THE PRACTICABILITY , EFFECTS AND ADVANTAGES OF A PLAN FOR THE RAPID CONVEYANCE OF GOODS AND PASSENGERS

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649240425

Calculations and Remarks, tending to prove the practicability , effects and advantages of a plan for the rapid conveyance of goods and passengers by G. Medhurst

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

www.triestepublishing.com

G. MEDHURST

CALCULATIONS AND REMARKS, TENDING TO PROVE THE PRACTICABILITY , EFFECTS AND ADVANTAGES OF A PLAN FOR THE RAPID CONVEYANCE OF GOODS AND PASSENGERS

Trieste

CALCULATIONS

AND

REMARKS.

CALCULATIONS

AND

REMARKS,

TENDING TO PROVE THE PRACTICABILITY,

EFFECTS AND ADVANTAGES

OF

A PLAN

FOR THE

RAPID CONVEYANCE

OF

GOODS AND PASSENGERS

UPON AN IRON ROAD

Through a Tube of 30 Feet in Area,

BY THE

POWER AND VELOCITY

OF

AIR.

By G. MEDHURST,

Inventor and Patentee,

DENMARK STREET, SOHO, LONDON.

London:

PRINTED BY D. N. SHURY, BERWICK STREET, SOHO.

1812.

CALCULATIONS, &c.

THE great velocity of Air through an aperture, or tube, has hitherto been but little noticed, although the effect, from the extreme lightness of that body, and the well-known laws of motion, must have been manifest by observation or the least reflection upon the subject.

It may be made manifest by an experiment with a pair of common bellows, by comparing the quantity of Air that escapes in a given time with the aperture through which it passes, by which it will appear, that Air may be driven with a velocity of 200 feet in a second by the pressure of the hand. And if an experiment is made with due precision by an instrument contrived for that purpose, it may be proved that Air will pass through a tube with a velocity of 200 feet in a second, by a pressure of 134lb. per square foot,

and 73 feet in a second, or 50 miles per hour, by a pressure of 250 ounces per square foot.

Of the power of Air in forcing heavy bodies through a tube, there is abundant proof; it may be clearly seen and very strongly exemplified in the air-gun, and still more forcibly in a piece of artillery, where balls of immense weight are instantaneously forced into such rapid motion, merely by the strength of the Air, a velocity that is more than twenty times greater than is required for this purpose, and for which the force of the Air, in so small a tube, must be at least 40,000 times greater than what is necessary to drive a ton weight by a regular impulse fifty miles in an hour, through a tube of 30 feet area.

In order to apply this principle to the purpose of conveying goods and passengers from place to place, an hollow tube or archway must be constructed the whole distance, of iron, brick, timber, or any material that will confine the air, and of such dimensions as to admit a four wheeled carriage to run through it, capable of carrying

passengers, and of strength and capacity for large and heavy goods. The tube must be made air tight, and of the same form and dimensions throughout, having a pair of cast iron wheel-tracks securely laid all along the bottom, for the wheels of the carriage to run upon. And the carriage must be nearly of the size and form of the tube, so as to prevent any considerable quantity of Air from passing by it.

If the Air is forced into the mouth of the tube behind the carriage, by an engine of sufficient power, it will be driven forward by the pressure of the Air against it; and as the Air will be continually driven into the tube, the pressure against the carriage, and consequently its motion, will be continually maintained through the whole length.

The interior dimensions of the tube to answer the purpose of internal conveyance effectually, should be 6 feet high, and 5 wide, 30 feet in area. This will admit a carriage sufficiently large for passengers, and in general for all portable goods.

And in order to convey both ways at the same time, it will be necessary to have two tubes of the same form and dimensions, one to convey constantly one way and one the other.

There will be no necessity for the carriage to fit very precisely to the tube, so as to be worn away by the friction against it, or to increase the resistance of the carriage; for if there is one inch of open space all round, between the carriage and the sides of the tube, the quantity of Air that will escape through that opening will not exceed the twenty-fifth part of the whole that is forced in, and which may effectually be compensated by increasing the power of the engine in the same proportion.

A carriage, running upon wheels that are accurately fitted upon their axle, and truly circular, having an even and horizontal iron road for the wheels to run on, will be driven by a force that is equal to one twentieth part of its own weight; therefore, if a loaded carriage weigh three and a half tons, it will be driven by a force that is equal to 392lb. which, in a tube of 30 feet area,

is 209 ounces per square foot; consequently, if the road rises above the horizontal line one foot in twenty, it will require a double force; and all intermediate degrees of inclination will require a proportional increase of force; and therefore, if the road rises 100 feet in a mile, the impelling power upon the carriage must be equal to 536lb. which, in a tube of 30 feet area, will be 286 ounces per square foot.

If the tube is six feet high within side, it will admit of the carriage wheels to be 5 feet 10 inches in diameter, which must turn four times round in a second to go fifty miles per hour; and if they are truly circular, and accurately fitted upon their axis, and the iron road clean, even, and regular, the motion of the carriage, without the aid of springs, will be nearly as smooth and steady as a boat upon a canal, and consequently a less degree of strength and weight will be required in the carriage than what is necessary for carriages that run upon a common road.

The force necessary to drive the Air 73 feet in a second, or 50 miles an hour, being 250 ounces