ATTRACTION PRODUCED BY JETS OF STEAM OR AIR.

In a recent number* we described a few of the remarkable experiments of Mr. Charles Weyher on aerial vortices and revolving spheres. Among those that we passed over in silence, there is one which is of a nature to especially interest the friends of physics without apparatus, since it can be easily repeated by any one, with the aid of a few easily procured objects. It relates to the attraction produced by a jet of air, steam, or any fluid whatever. To the left of Fig. 1 may be seen the nozzle of a blowpipe, from whence is escaping a jet of steam. This jet holds captive a small ball of cork and a rubber balloon inflated with air, which have been placed in it. The nozzle may be inclined at an angle of 45° with the horizon without the balls falling. If the hand be placed in front of the balloon, the two spheres will approach the nozzle and each other. The densest sphere will be in equilibrium nearest the nozzle.

Now for some analogous experiments in physics without apparatus. The first one that we shall describe was communicated by Mr. Roy de Pierrefitte. It can be easily performed with a little application. As spherical a pea as possible is selected, and, if dry, is allowed to soak for a while in water, in order to soften it, so that a pin can be passed through its center without splitting it. This done, we take a clay pipe stem, about two inches in length, and place the pea upon one of its extremities in such a way that one of the ends of the pin shall enter the aperture, and hold the pea in position. Putting the other extremity of the stem between the lips, and throwing the head back into a horizontal position, we begin to blow gently, and at first slowly. The pea is lifted, and, when we begin to blow with more force and

Fig. 2.—A PEA HELD IN A JET OF AIR.

with regularity, will rise and be held in the jet of air, entirely isolated, and will revolve whenever the pin receives a thrust from the air (Fig. 2).

Egg shells placed upon a jet of water are held thereon in the same way.

*SUPPLEMENT, No. 588, p. 9383.

The second experiment was communicated to us by Mr. Leon Couratier, a student at Paris.

A metallic pen holder, closed at one of its extremities, is taken, and at about half an inch from this closed end a circular aperture is made. Putting the open extremity of the pen holder into the mouth, we blow in

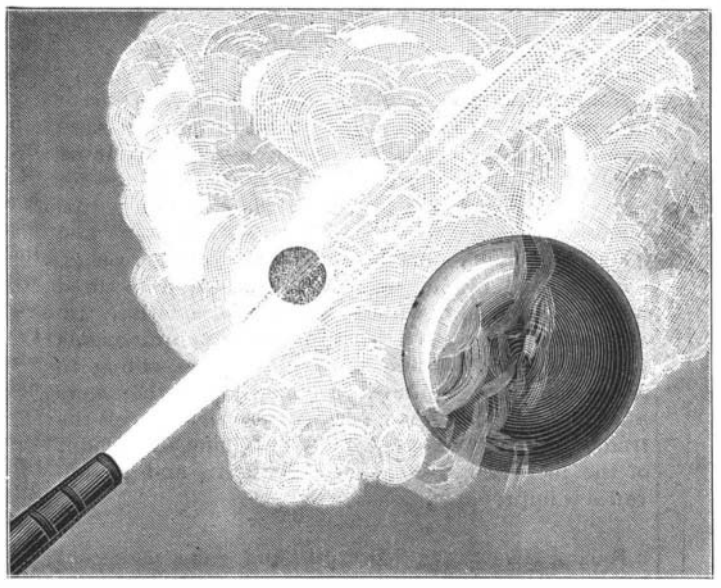


Fig. 1.—A CORK BALL AND RUBBER BALLOON SUSPENDED IN A JET OF STEAM.

such a way as to form a regular jet of air, which makes its exit through the orifice in the upper part of the cylinder. If a small ball made of bread crumbs be placed in the jet, it will be held in equilibrium, as shown in Fig. 3, and will remain thus as long as the flow of air continues. The ball should be as spherical as possible, and its size will vary with the density of the material of which it is composed and with the diameter of the orifice.

Analogous experiments may be easily performed in a more perfect manner with a fan blower or a gasometer. It is sufficient to produce a regular and rapid flow of air or steam at the extremity of a nozzle.—*La Nature.*

IMPROVED STEAM ROAD ROLLER.

In the self-propelling machine which we herewith illustrate, the material is so distributed as to facilitate the turning of corners and easy management of machine under all circumstances, and to give the drivers the adhesion necessary to overcome all ordinary obstructions and grades of street. With this end in view, the rear drivers and the front roller or steering wheel are as large in diameter as good design would permit. It is evident that small rolls are apt to work mischief, and that weight on the front drum in excess of its proportional diameter would have a tendency to push and crowd the material instead of mounting it. In this machine, two-thirds of the total weight is transmitted through the rear rolls, this having been found to produce the best results. The face of each roll measures twenty-four inches.

The forward wheel is divided into four sections, so that it will turn without digging up the road, and the width of this wheel is equal to the distance between the two rear ones. The drum has a universal movement, and readily adapts itself to any unevenness of road surface without straining any part. The boiler is made of extra heavy steel plate, double riveted, with water bottom type of fire box. The axles, countershaft, and gearing are very heavy. The engine cylinder is provided with a steam jacket, and the shaft, piston and valve rods are of steel. The reversing gear is simple and reliable. The construction of the tank is shown in the engraving; this form of tank admits of easy access to the foot board and fire door, and leaves a direct communication with the ash pit. The engine can be readily disconnected from the propelling gear, and can then be used for driving stone breaker and other machinery. Thus, when the roller is not required on the streets, it can be used as an ordinary engine. The engine is equipped with pump, locomotive inspirator, governor, whistle, and all other necessary auxiliaries. The boilers are all covered with wood lagging and Russia sheet iron jacket, not shown in the cut. This type of roller is made in sizes from 10 to 20 ton, and has many marked improvements which, upon examination, will be apparent to those conversant with the subject. The United States Commissioners at Washington, D. C., have just placed an order for a 10-ton roller with this company, to be used in the District of Columbia.

All further information concerning this roller will be furnished by the Foundry and Machine Department (Harrisburg Car Manufacturing Company), of Harrisburg, Pa.

PACIFIC STEAM NAVIGATION.—A line of steamers to Japan and China, running in connection with the Canadian Pacific Railway, will soon be in operation.

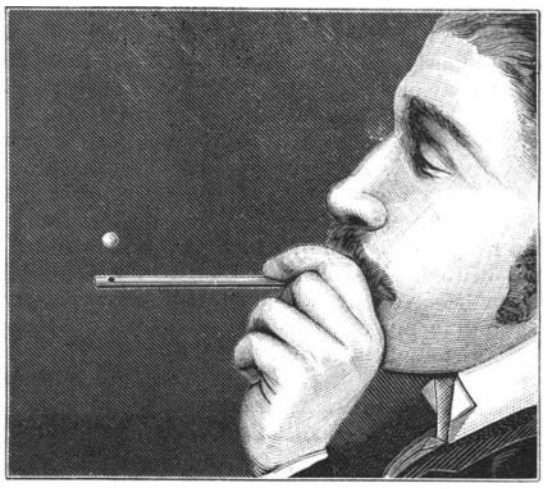
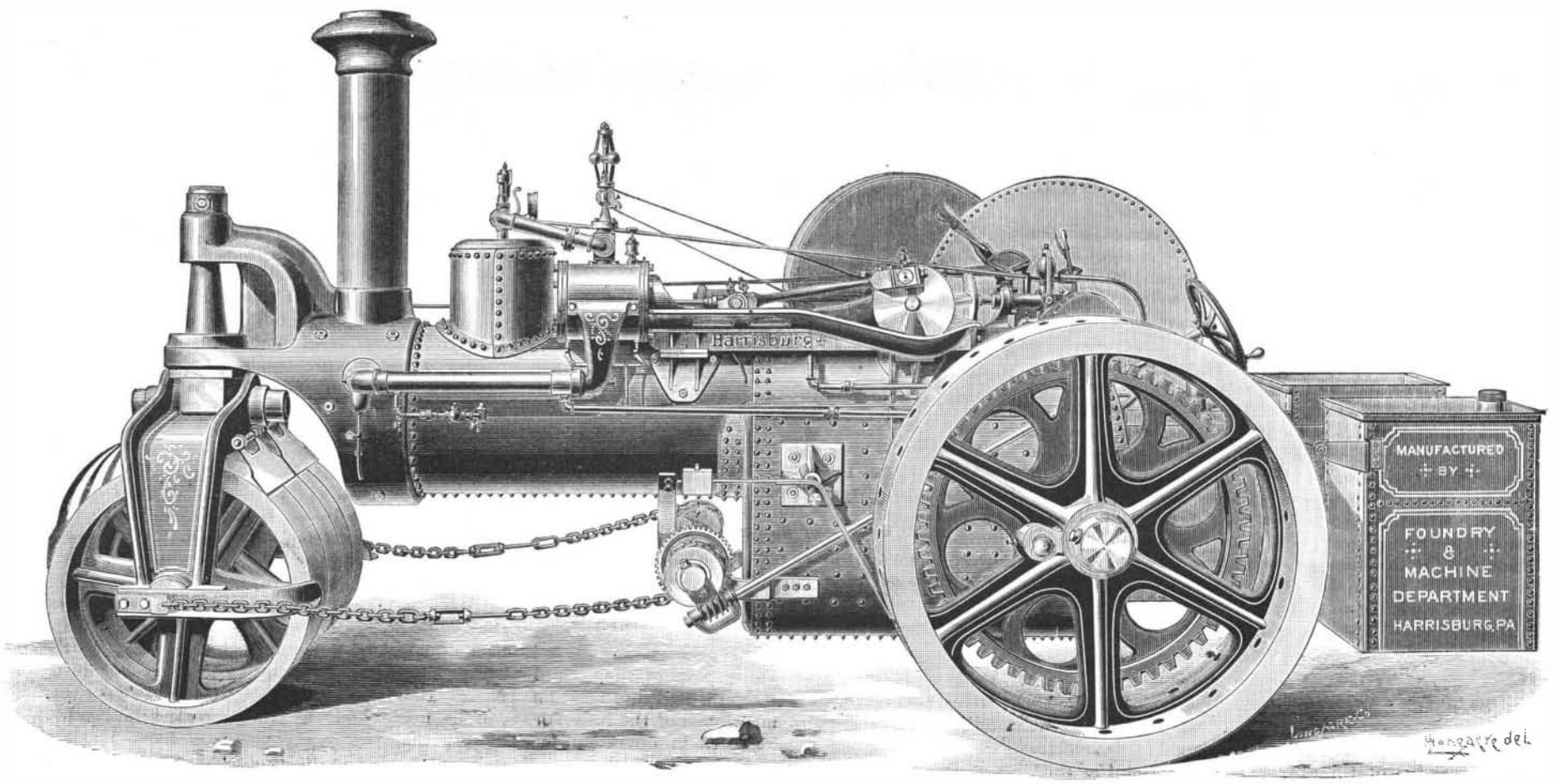


Fig. 3.—A BALL HELD IN A JET OF AIR.

Three Cunard steamers have been obtained and fitted with triple compound engines, guaranteed to attain a speed of 14 knots per hour. The Parthia will leave Hong Kong early in May, as the first of the line. Stoppages will be made at Hiogo and Yokohama, Japan.



IMPROVED TWENTY-TON STEAM ROAD ROLLER.