New Inventions.

For the Scientific American.

Railroad Accidents.--A Suggestion.

Very many accidents, attended with loss of life, happen every year on our Railroads, and for the purpose of illustrating my ideas in this communication, I divide them into two classes, viz., those that happen to persons who are run over, who may be on the track in advance of the train, and those that happen to individuals on the train, or, may be, at the side of it. A numerous portion of the latter class are by reason of persons falling between the cars on to the rails, and those who may be on the outside of the rails (perhaps in haste to get on board,) accidentally stumbling and falling across the rails; the result in either of the two cases of the latter class named above is a terrible death.

What I would propose as a safeguard, for the prevention of accidents, and death to those who may be on the train and fall between the cars, and to those who may be on the ground outside of the track, to prevent their falling on the rail by stumbling, or otherwise, is simply this:—I would in the open space, between the tracks of a car, and in the open space between two cars when attached together, make a partition (I call it a partition for want of a better term) which would close up the space between the rails and the body of the car; this partition can be easily made and might reach nearly down to the rail, and being directly above the rail and in the rear of the truck, would not come in contact with any thing near the rail. This partition of one car, and the partition of another, when two cars are attached together, would meet each other and thus form a perfect and continuous guard from one end of the train to the other, against the class of accidents I have adverted to. One life would have been saved on the Manchester and Lawrence Railroad, on the 15th of Dec., had there been a guard of this kind. PRECAUTION.

Improvement in Gold and Silver Pencil Cases.

It will be observed on our list of patents this week, that one is granted to Mr. Albert G. Bagley, New York, the celebrated gold pen manufacturer. We have seen his invention, and consider his pencil cases (his pens need no recommendation) to be the neatest in the market. Mr. Bagley has a very fine mechanical mind and exquisite taste. He is always getting up something new and good, and the patent just issued combines one of the most original and uncounterfeitable inventions in its line that has yet been brought before the public.

Propeller for Canals.

Mr. Joseph Grant, of 138 High street, Providence, R. I., has invented a propeller for canals to prevent the washing of the banks, which presents some good features. He employs a tube or tubes running the entire length of the vessel, and places a screw in the after part of said tube or tubes. The water comes out behind without creating any side surges, and the vessel is very compact and snug for entering locks. He has taken measures to secure a patent.

Machine for Repairing Roads.

Mr. N. Potter, of East Hamburg, Erie Co., N. Y., has invented a machine which removes heaps on the sides of ruts, and fills them up at the same time. It can also plow up high places or heaps on the road, and by back moveable scrapers, the dirt can be directed to the middle or from the middle of the road. It is drawn like a wagon and is otherwise very simple.

Measures have been taken to secure a patent.

New Rotary Engine.

Mr. George Creary, machinist, of this city, has invented an improved rotary engine, which is said to remove all the decidedly good objections made against the other engines of the same class. It works on the expansion principle, and it takes in the steam at two opposite sides, and does not work the valves as is commonly the case, by the pistons.

New Way to Manufacture Shot.

It is well known that for a number of years past, all our shot for fowling pieces has been manufactured by dropping the molten lead a great distance. For this purpose tall towers were erected, as ably treated in an article in the Franklin Journal, by Mr. Ewbank. The present invention, which has been patented both at home and abroad, by Mr. David Smith, of this city, is designed to make the shot in any building, to obviate the necessity of using tall towers; and it will be seen that the principle of the invention is founded on scientific principles, and is highly ingenious, and consists in driving a current of air in a contrary direction to the falling lead, which combined with the velocity of the falling lead from a low height (about 50 feet) will cool the metal as well as if it fell from a great height; the velocity, according to the size of shot desired, being the cause of this. This cut is an elevated section of the conduit passing through two floors of the building.

A A is a vertical metal tube, about 20 inches in diameter. The lower end of the tube is a truncated cone, which rests on a water chamber, B. C C is an annular chamber. The upper surface of this chamber is perforated, through which air is admitted to the body of the tube, A, the air being forced in passing through the tube D, by a blower, to give the air the required velocity in the tube. E is a shute to guide the shot into the box, F. G is a place to remove it. The shot drops down the tube, A, and passes through the water into the chamber, F. The upper part of the tube has a trumpet mouth, to allow the air to pass freely out at the widest part. H is the pouring pot, resting over the concentric chamber, L 1, which is supported by six arms, secured inside on the tube, as indicated by the diametrical flange at the bottom of the enlarged part above. The pouring pot has a perforated bottom to diffuse the molten lead over the area of the channel, L 1, and L is a spill chamber to receive any lead that may run over, not to let it go down the tube. The metal thus falling must have an upward current of air that will meet the lead with a velocity, for the short distance, equal to that which the shot meets the air in the great distance through which it falls in high towers. By increasing the current of air, an equivalent for any fall may be obtained.

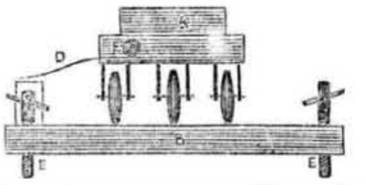
Shot by this process is now manufactured in Water street, this city, by Messrs. Thos. O. Le Roy & D. Smith. The machine is in perfect operation, and makes far better shot than by the old high tower method; for this reason:—"The shot in falling 200 feet in the high tower, acquires too great a velocity, and they are injured by the force with which they strike, while in the new method, the shot is supported by the ascending current."

This is one of the most original and best inventions that has been brought forward for a long time, and as in a great number of such cases, the inventor possesses a real modesty and quietness regarding his invention.

For the Scientific American.

Action and Re-Action.

FIG. 1.



One of our popular works on Natural Philosophy says, "A man in a boat, pulling a rope attached to a large ship, seems only to move the boat, but he really moves the ship a little, although its velocity is as much less than that of the boat as its weight is greater." That is, the velocity of the two bodies thus put in motion, will be inversly in proportion to their weight. This is doubtless a deduction from the position that action and re-action are equal. It is not my present object to determine how far this consequence is deducible from the premises, nor to contend with theories; but I shall endeavor to test the effects of forces thus exerted in practical application.

A*	12	*g*,	12	*D
B*	12	*h*,	6	**E
C*	12	*i*,	3	****F

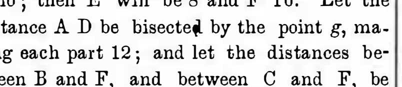
Let A B C and D represent four equal bodies, each of whose weight shall be indicated by 4, and let E and F increase in a two-fold ratio; then E will be 8 and F 16. Let the distance A D be bisected by the point *g*, making each part 12; and let the distances between B and F, and between C and F, be 12+6 and 12+3, as above indicated, making the distances from the central points, *h* and *i*, inversely in proportion to the weight of the respective bodies.

Then a man standing on D, and pulling a rope fastened to A (the weight of D being still 4, with the man included) will, with a certain force, cause both bodies to move equally, and arrive at the same time at the point *g*, their resistance being equal. Then agreeably to the theory before us, the same force applied in the same manner between B and E, will bring them to meet in the point *h* in the same time; or if the same force be applied in the same way between C and F, they will meet in the same time in *i*, and the product of the respective weights and distances of the several bodies will be expressed thus:

$$4\times12=12\times4$$
$$4\times12=6\times8$$
$$4\times12=3\times16$$

Now there can be no question but that a man standing on a fixed object at *g* must exert a force of $4\times12=48$, to draw the body, A, to him in the same time that was required to bring A and B to that point in the former case. The same force will be required at *h* to bring either B or E to that point, or at *i* to bring either C or F to that point.

FIG. 2.



If a man stands on a fixed body and acts upon a moveable one with a given force, his effect on the moveable body will be greater than can be produced by the same force when the operator stands on a body that is moved more or less by the application of that force. But in the illustration, a man standing on D, and exerting a given force, draws A towards him, and at the same time moves D with the same velocity; but when he stands on E and uses the same force he moves E with less velocity than he did D, or (as our theory says) with but half the velocity of D. And again, when the operator stands on F, exerting the same force, he moves F but one-fourth as fast as he did D, yet in these several cases he is supposed, according to the theory, to move A B and C equally, notwithstanding his giving to the body on which he stands four times as much velocity in the first case as in the last.

For the practical illustration I have prepared apparatus, consisting of two cars placed in a horizontal table, with adjusting screws for leveling. Fig. 1 is an end view of the table, showing one car on it; A is the car with three wheels, two at one end and one at the other; B is the table: C is a raised ledge on the side of the table, on the upper surface of which is marked a scale of inches and tenths, pointed to by the index D to show the distances moved by the cars; E E are screws for leveling the table; F is a spiral spring projecting from the car so as to press upon the corresponding part of the opposite car. Each car has such a spring; so that by these they mutually repel each other when pressed together.

Fig. 2 is a side view of a part of the table with the cars on it; G is the table; H is the raised ledge, hiding parts of the car-wheels, I I are the spiral springs; K K are the indices; L L are projecting parts of the cars, to be brought in contact when the springs are sufficiently compressed for action.

When these projecting parts of the cars are brought together; they are held in that position by a clasp, which may be detached without giving any impulse to the cars, only setting them free for the action of the springs. The cars are 7 inches long and 3 wide, weighing 10 ounces each; but a small part of the table is shown in the figure. It should be four or five feet long. When the table is properly leveled, and the cars pressed together and clasped, they are prepared for experiment. When prepared in this way, on detaching the clasp each car ran 13.7 inches.

On putting 5 oz. on one car, so as to make it 15 oz., the loaded one ran 7.3 inches and the light one 16.5.

When the load was 10 oz., making with the weight of the car 20 oz., it ran 5.3 inches, and the light one 18 inches. When increased to 30 oz. it moved but 2.8 inches, while the light one moved 19.3 inches. When I placed a heavy piece of iron behind one car to prevent it from moving, the other being light, ran 27.5 inches, and when loaded to weigh 20 oz., it ran 15 inches. SILAS CORNELL.

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[We will give the experiments in a tabled form next week.

Naval Science.

Commander Jerningham of the British Navy is concentrating the broadside of the ship Leander. The object of this is to ensure the certainty of the delivering the first broadside with the most deadly effect; the whole of the guns should be fired simultaneously or the smoke from a single gun would obscure the object at the moment the others are to fire; and after the smoke has rendered everything invisible from between decks, the only chance of getting a sight of the enemy is from the upper deck, or aloft, as long as the masts are left standing. Captain Jerningham's plan, therefore, which was satisfactorily proved on board the Wellesley in India and in China, in 1837, and on board the the Excellent in 1847, is one that may be adopted in every ship without any additional fittings, and that in a few hours. The guns may be brought into position to cover a horizontal line varying in length from one inch to fifty feet, at any distance up to six thousand yards within the angle of training of the guns in the ports, and the fire repeated with the same precision and rapidity as is now done with the single guns.

Improvement in the Manufacture of Velvet.

A manufacturer in Lyons, France, has commenced to make both plain and ornamental silk velvets of three yards in width. The quality is said to be equal to the present narrow web. We have doubts regarding the possibility of making such wide goods, of equal quality with the narrow.

Improved Hot Air Engine.

We learn by the Philadelphia News that Dr. Evan J. Pursey, of that city, proposes to construct an engine to be propelled by heated air, which combines many advantages over engines of this kind that are in use at present. The project, we have heard, has occupied the attention of the Dr. for a long time.

An artesian well was sunk in Leicester Square, London, lately, and a continuous stream poured forth to supply Buckingham Palace, &c.