## IMPROVED RAILWAY ELEVATOR.

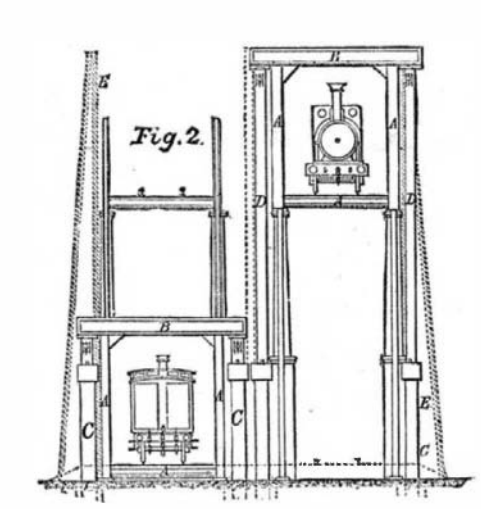
We illustrate in the annexed engravings a method designed by Messrs. Clark & Standfield, Westminster, of meeting one of the difficulties in connection with high and low level traffic on many of our existing and proposed railways.

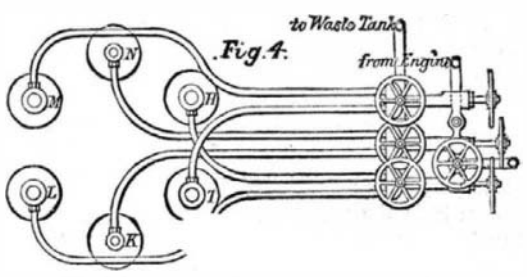
By means of these arrangements trains may be quickly and economically transferred from one level to another. The lift consists principally of a strong wrought iron rectangular frame, A, of sufficient breadth and height to admit all classes of ordinary rolling stock, the length being of course somewhat greater than that of the train to be lifted. The sides of the wrought iron frame are formed of open lattice girders, of such a depth that the transverse beams, B, may be clear of the top of the train. On each side of the wrought iron frame a series of hydraulic presses, C, is placed at suitable intervals. They are so arranged that the lifting power of the rams, D, is applied to the projecting ends of the transverse beams, B, so that the weight of the train is supported at points considerably above its center of gravity. By this arrangement a great deal of excavation for the presses is avoided and their upper ends are always easily accessible. At one or more points in the length of the lift there is provided a powerful wrought iron or other guiding frame, as at E, which serves to keep the lift always truly in a line with the rails on the approaches. The entire system of presses for each lift is arranged in a series of groups in such a manner that the failure of any group or single press would not endanger the stability nor delay the working of the lift, or there may be a separate ram and press in the accumulator for each one in the lift; both these arrangements insure the perfectly synchronous working of the rams. A certain number of rams also on each side of the lift are provided with safety valves arranged in such a manner that the slightest difference in level, either longitudinal or transverse, is immediately rectified automatically by the action of the valves at the higher end or side of the lift.

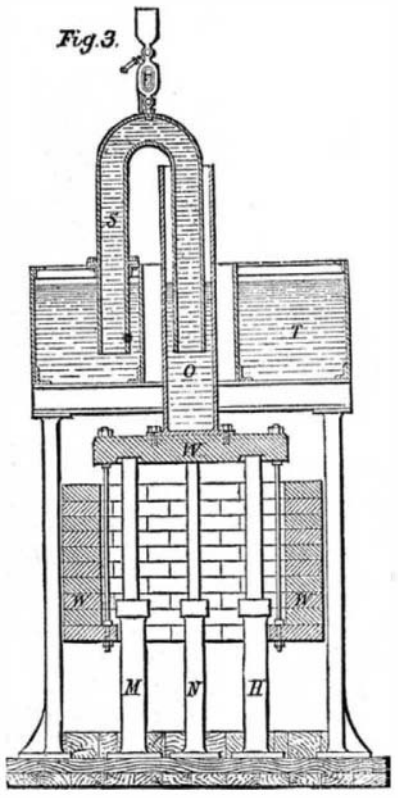
Each approach to the lift is protected by a powerful movable hydropneumatic buffer, as shown at G, one being closed and the other swung back to allow entrance or departure of the train from the lift. Each end of a lift is protected by a similar buffer. Any number of lifts may be placed side by side and worked in pairs, or preferably each lift independently with a differential compensating accumulator.

Figs. 3 and 4 show a sectional elevation and a plan of such an accumulator specially suitable for lifts requiring to be rapidly and economically manipulated. It has four principal presses, H, I, M, L, and two small auxiliary presses, K, N. On the tops of the rams strong crossheads are provided, to which are suspended the balance weights in the ordinary way, as shown at W. To the crossheads there is attached a compensating water tank, O, the area of which is made proportional to the areas of the rams, H, I, M, L, K, N. This tank is always kept in communication with the large fixed tank, T, by means of the siphon, S. The rams, H, I, M, L, alone are of such dimensions that when put in communication with the lift the weight, W, will descend, causing the lift to ascend to its full height, the rams, K, N, being idle during the downward travel of the accumulator and merely connected with the waste tank. When it is desired to lower the lift, the rams, K, N, are put in communication with the four rams, H, I, M, L, so that the pressure will be distributed over the six rams instead of four, and on opening communication with the lift the latter will descend. Thus the lift may be manipulated by the simple act of putting into and out of use the two small rams, K, N, and it will be evident that the only power wasted will be represented by the insignificantly small amount of water supplied to the presses containing the rams, K, N, once every double journey.

Many modifications of this accumulator have been arranged by the inventors, Messrs. Clark & Standfield, by which an increasing or decreasing pressure may be conveyed from the accumulator at any part of the stroke, thus making them of almost universal application where either constant or varying hydraulic pressure is required. These lifts are specially adapted to be used in connection with high level bridges and submarine or other tunnels alike for railway and road traffic, thus entirely obviating the difficult and enormously costly approaches otherwise necessary.—*Engineering.*




IMPROVED HYDRAULIC ELEVATOR FOR RAILWAY TRAINS.

### The Mungoose in the West Indies.

Mr. D. Morris says that in all the West Indian Islands the black and brown rats are cause of great loss to the sugar planters, spite of rat catchers, with the bow string traps, and their aids in the shape of dogs and poison. Jamaica has also become possessed of the formidable and destructive *Mus saccharivorus*, an animal with a body ten inches long. To combat these pests, various animals were introduced, but the ferret succumbed before the attacks of the chigo; the Cuban ant (*Formica omnivora*), though it maintained itself and remains one of the planter's best friends, destroying the young of the rapacious rodents, also attacks kittens, puppies, and calves, and the agua toad devours young ducks, depopulates beehives, and drives away sleep by its croaking, but does not eat rats.

In 1872 nine mungooses were brought direct from India and turned loose. In ten years these have so multiplied that they are abundant all over the island, and are now found even at elevations of 5,000 feet. Cuba, Porto Rico, Barbados, and Santa Cruz have also been supplied with these animals, and their first patron, Mr. Espent, has undertaken to ship some to Australia and New Zealand to combat the rabbit pests. As a rat catcher this animal has proved itself worthy of its reputation, as it has reduced the expenses of rat catching fully 90 per cent, and has reduced the quantity of rat-eaten canes to one-fourth or one-fifth of what it was previously, representing an annual saving to the island of nearly £45,000. Notwithstanding this benefit, the short history of the mungoose upon the island goes to prove that the introduction of a new species into a district should not be done rashly. The mungoose is now too common, and is making itself felt in other ways besides rat catching. It to some extent preys upon eggs and chickens wherever dogs are not kept, and quail, wild guinea fowl, game birds generally, as well as sea and water fowl, are rapidly diminishing before its attacks, as are also the yellow snakes, themselves good rat catchers (*Chilabothrus inornatus*), and the ground lizard (*Ameiva dorsalis*). As the mungoose cannot climb a tree, the rats, especially the black species, take refuge in cocoanut plantations, and prove more destructive than formerly; but, on the other hand, the coffee and cocoa plantations profit greatly by its introduction.

### Benzoic Sulphinide, a New Sweet Compound.

Constantine Fahlberg, Ph.D., in a paper lately read before the Franklin Institute, says, in connection with an investigation upon the hydrocarbons of the coal tar group, it was discovered that a certain compound obtained by the oxidation of toluene-sulphamide with potassium permanganate tasted sweet. The sweetness was so intense that a few drops of the cold mother-liquor, remaining on and being partly washed off my hands, could be easily detected by the taste. As soon as I had discovered this property, peculiar only to this particular mother-liquor, the substance obtained from it was subjected to several tests in order to determine whether it was poisonous to take it in larger quantities or not. At first a cat and then a dog was subjected to this cruel treatment, but they remaining fortunately alive and apparently not in the slightest degree affected by it, I decided to take several grammes of it myself. The result was not the slightest inconvenience experienced from it. I subjected, the next morning, my urine to the chemical test, and found it to contain almost the entire quantity taken the previous night.

The compound which I now will exhibit to you forms salts with any carbonate of the alkalies, alkaline earths, or metals, and all of which you will find taste sweet. It is, however, not an acid, but belongs to a class of bodies which Professor Remsen and myself have given the name of "sulphinides," the compound in question being benzoic sulphinide. It is very readily soluble in alcohol, more so than in cold water, in which it only dissolves readily when it is hot.

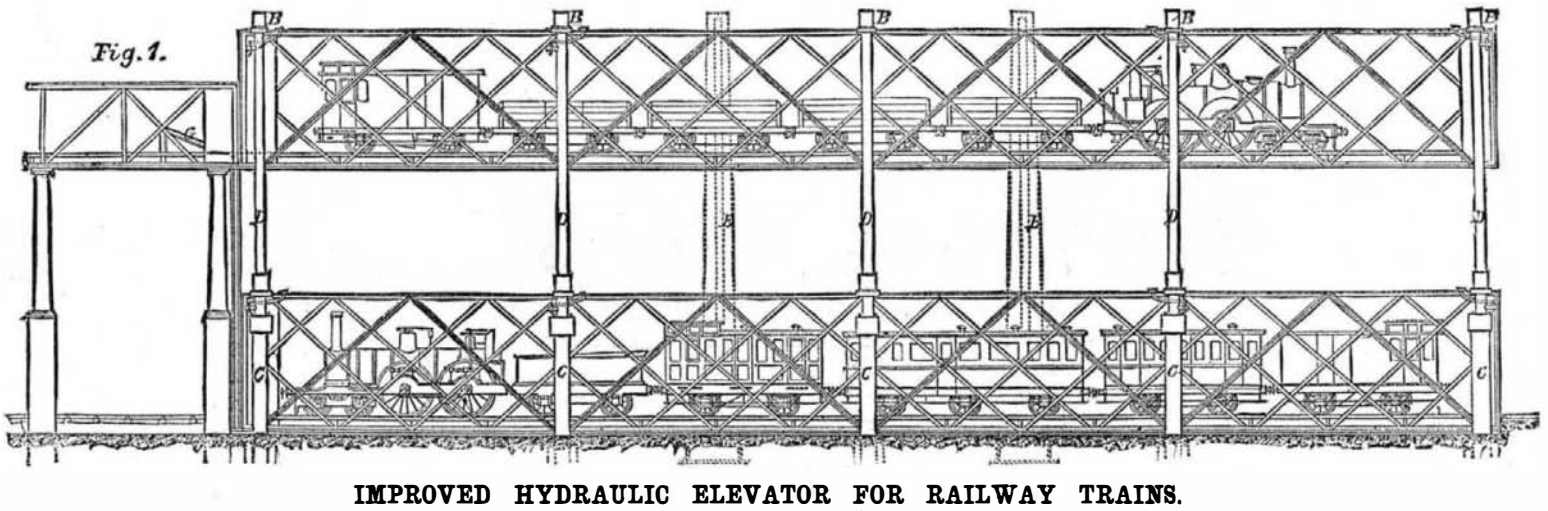
I am making the attempt now to prepare it in larger quantities and by cheaper methods, and have no doubt that it will find extensive use in medicine and for technical purposes. One experiment made lately was to sweeten glucose, which, as you all know, tastes only faintly sweet, and the result was a complete success.

As soon as I shall have found the method by which to prepare it on a manufacturing scale I shall come before you again, and, as I trust and hope, with larger samples than now, ready to give answer to all questions in regard to its price, application, etc.

### An Odoriferous Accumulator.

Mr. W. H. Preece thus speaks of a new accumulator that he saw at the recent Munich Electrical Exhibition: It was the invention of Herr Shulze, of Strassburg. The novelty is that Herr Shulze takes his lead plates and coats them with a thin superficial layer of plumbic sulphide (PbS). The lead plates, very finely grooved, are heated in sulphur, in what form I do not know, but they come out coated with a superficial layer of what we used to know as the black sulphuret of lead; this is put into a bath of sulphuric acid, and the result is that there is sulphide of lead opposed to sulphide of lead, through which the current goes, with the result that on the one plate the hydrogen and the water combine with the sulphur, forming that sweet and delightful perfume called sulphureted hydrogen; indeed, the effect of the current on this plate in producing sulphureted hydrogen was only too evident in the neighborhood of this secondary battery, for the smell of rotten eggs is sweet to the odor of Herr Shulze's secondary battery. When the operation is complete, and when everybody is driven away, then it is said that the battery is ready for action.

Each cell when complete weighs 23 pounds, and it takes a current of 4 amperes for 60 hours to form it. The efficiency is small.

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