

Free Canals and Canal Improvements.

One of the notable features of the recent election in this State was the enormous vote in favor of entirely abolishing tolls on the State canals. For a long time the great food staples and some other commodities have been on the free list, and latterly all the West bound freight has been exempt from tolls. Under the new law the Erie Canal and its tributaries will constitute a free waterway the whole length of the State, from the Hudson River to the Great Lakes, for eight months of the year. The canals give employment to about 6,000 boats.

The object of the abolition of tolls is to increase the traffic of the canals, so as to make them a more potent factor in solving transportation problems, and in helping to maintain the commercial supremacy of New York. How far the end aimed at will be furthered by the change remains to be seen. The inability of the canals to be the dominant factor in controlling the charge for transportation across the State, and in determining the course of trade in competition with railways, however, would appear to be due less to the amount of tolls hitherto demanded, than to the inability of the canals to meet promptly and parallel the improvements in transportation introduced by the railways. In carrying capacity and economy in transportation the railways are progressive, while the canals are, or have been, practically stationary.

As Mr. Robert Taylor, of this city, has pointed out, the Erie canal boat, towed by two horses, and the 20-car wheat train hauled by a 30-ton locomotive, were for many years equivalent units in wheat transporting capacity, with the advantage of greater economy in favor of the canal.

"So long as this continued, the canal was the regulator of grain freight rates, but as the volume of grain transportation increased, railway improvement was stimulated, and the advent of heavy steel rails suggested better ballasting of the road bed and heavier and closer laid ties. Then came the 70-ton Mogul locomotives, which could fairly fly with forty cars, each containing 500 bushels of wheat—a train load of 20,000 bushels—when the railroad became the regulator of grain freight rates, being able to carry at much lower prices than the canal could possibly carry at, even at 2½ cents, if necessary, and make money."

To raise the canals to their old commercial rank two things are proposed. One is to make the Erie Canal throughout a ship canal, a costly undertaking, and one that might prove the reverse of beneficial either to New York or to the cities along the line of the canal, as the actual benefit of the change would fall rather to the producers and shippers of the far West than to the people of New York.

Another and more reasonable proposition is to increase the carrying capacity of the canal by improving the existing lock gates. The old fashioned, slow moving swinging gates are still used. By a change to lift gates, which could be done without great expense, the available length of the locks would be increased by 35 feet, and the canal boats might be made 130 feet long instead of 97 feet as now, with a proportional increase in their carrying capacity, or from eight thousand to ten or eleven thousand bushels of wheat. The cost of operating the larger boats would be little, if any, greater than for the boats now in use. With improved lock gates, it is further claimed, the carrying capacity of the canal might be five times what it ever has been.

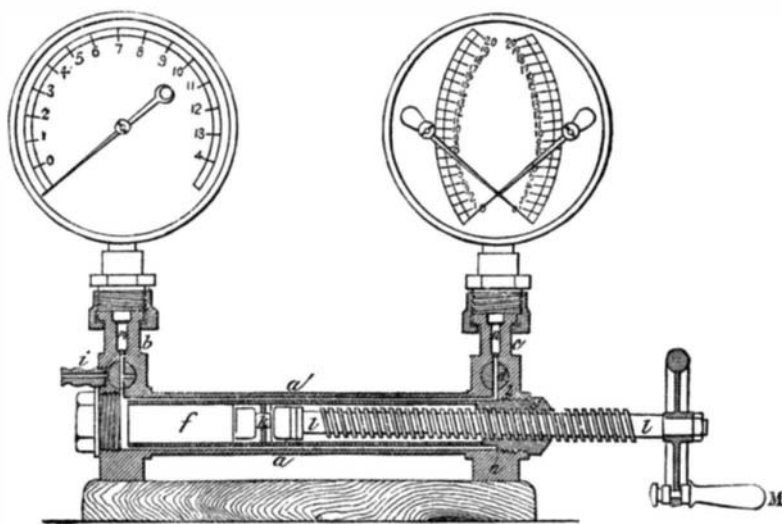
Touching the proposition to abandon the canals entirely as having outlived their period of economical usefulness, it is urged that water carriage remains, and is likely always to remain an important commercial factor, even where railroads are most abundantly developed. Proof of this is seen in the large use of the great canals of England and Scotland, and in the efforts which the more advanced European states are making to extend their facilities for water carriage. Thus in France 74 per cent of the domestic commerce of the country goes over the canals, and efforts are making to largely increase the capacity of such artificial waterways. Germany, likewise, has entered upon the work of enlarging and improving the 2,000 miles of canals within the limits of the empire, and Holland and other states are spending large sums for a like purpose.

A FLAGEOLET player charmed all his hearers by his musical performances at Neuilly, near Paris. He had formerly suffered from diphtheria. Tracheotomy was performed, and the silver tube which was introduced at the time of the operation, and kept stationary by means of a circular pad, now serves the musician of Neuilly as a natural aperture through which he breathes, and so successfully that his flageolet playing was enthusiastically applauded by all present.—*British Medical Journal*.

APPARATUS FOR TESTING PRESSURE GAUGES.

The accompanying cut represents a small portable apparatus designed to test pressure gauges, and which is the invention of Mr. C. D. Gäbler, of Hamburg.

It consists of a brass cylinder, *a*, with tubes, *b* and *c*, provided with cocks, *d* and *e*. In the interior of this cylinder there is fixed, by means of a screw, *g*, a small pump chamber, *f*, in which moves a piston, *k*, actuated by a screw, *l*, with winch, *M*. When it is desired to use the apparatus, the gauge to be tested and a standard apparatus are connected with the cocks, *d* and *e*, as shown in the cut. But the apparatus must first be prepared by adapting to the tube, *i*, a piece of rubber tubing whose other extremity dips into a glass of water. The conduits, *n* and *m*, are then closed by means of the cocks, *d* and *e*, the latter, which is a three-way one, being turned so as to admit water through the tube, *i*.

**APPARATUS FOR TESTING PRESSURE GAUGES.**

The piston, *k*, is afterward led, by means of the screw, *l*, to the extremity of its travel, and the inner cylinder is filled with water. Then the cocks, *d* and *e*, are opened so as to allow the air to be disengaged, and the piston is gradually pushed in, so that the water shall rise above the tubes, *b* and *c*. The cocks are then closed, and the piston is withdrawn, so that the apparatus is entirely full of water. The two gauges can now be fixed to the apparatus. It is evident that on driving the piston forward the two gauges will be submitted to pressure, and that they may be easily compared in measure as the pressure rises.

For testing barometers, the operations are the same, save that the piston must be driven into the cylinder when the barometers are affixed to the apparatus. When the piston is withdrawn, a vacuum is created. It has been found that on maneuvering the piston twice in succession, care being taken to place the cock, *c* and *d*, properly, an almost perfect vacuum may be produced.

This apparatus has been devised for shops, and, as it is very portable, and takes up but little room, it is capable of rendering service to inspectors of boilers.

CATAPULT FOR THROWING LIFE LINES.

This apparatus is designed for affording a sure, speedy,

**CLAYPOOL'S CATAPULT FOR THROWING LIFE LINES**

and safe means of escape from the interior of burning buildings, from sinking vessels, and other places of danger. As shown in the engraving, the apparatus is supported by four wheels like an ordinary wagon. It is provided with a very strong frame, upon which is mounted sector wheels, which are moved by a pinion on the crank shaft, to adjust the elevation of the powerful compound springs mounted on a frame of which the sector wheels form a part. These springs are fixed at their larger ends to the frame near the pivot of the sector wheels, and their free ends are connected by a cross bar carrying a cup which receives the ball attached to the line to be thrown.

On the lower part of the bar to which the cup is attached is fixed a hook which is caught by nippers attached to a rope wound on a windlass journaled on the lower arms of the sector wheels. The rope is wound through a funnel which serves to trip the nippers and release the springs when it is desired to project the ball.

That part of the frame not occupied by the gearing, sector wheels and springs is floored over, and at convenient places thereon are placed coils of lines or ropes with balls attached in light movable cans with flaring sides, the line to be first thrown being placed on the rear of the frame in the center. In diagonally opposite corners of the frame are embedded four levels, two in each corner, and its frame can be made level by means of the leveling screws passing through nuts in each corner of the frame, whatever be the inequalities of the surface on which the wheels rest.

In practice the apparatus is kept in readiness for removal at an instant's notice, with the sector wheels elevated as far as possible and made stationary, the nippers caught on the hook at the end of the springs, and the rope held taut by the windlass. Having been rapidly hauled to the scene of operations, the apparatus is turned with the rear toward the place where the danger is. The apparatus can be then turned or aimed in any direction by simply backing the horses. The direction having been obtained, the frame is rapidly leveled by means of the leveling screws, the desired elevation obtained by the gearing operating in the sector wheels, the ball to which the line is attached placed in the cup, and the springs brought down by the rope and windlass till they are loosed by the nippers being drawn into the funnel, when the ball carrying the line will be thrown to the desired place.

Should it be desired to reach more than one point, any number of lines which may be prepared could be thrown by removing the can containing the line first thrown and replacing it by another.

Seats may be arranged on the frame for the entire crew needed to manage the apparatus, three men being all that is required—one driver and two to manage the apparatus. Such a crew, with practice, would become so skillful that within a few minutes of its arrival at the scene of danger it could throw a line into any specified window or aperture of any building, or over any building or vessel, and thus provide a means of escape. Further information may be obtained by addressing the inventor, Philip W. Claypool, Summitville, Col.

Absorption of Moisture by Building Materials.

Every one connected with buildings of brick and stone knows the absorbent nature of those materials under the most favorable circumstances. It would astonish most people, adds the *Building News* (London), to be told what a large quantity of water is stored in the brick walls of an ordinary house after a heavy rainfall; the drying or evaporation of which must take place inside in cold weather, unless proper precautions are taken to render the walls impenetrable. The plea for hollow walls has been raised again and again in this journal, and though the system is coming to be adopted more generally in some districts, the idea of solidity of wall structure seems to have taken too deep a hold on the ordinary building mind to be given up. Some time ago a suggestion was made that colliery owners, and others who have large quantities of slag, might with profit utilize this material for building cottages and other purposes. We are not sure whether the hint was taken, but in some parts of the country the material furnishes an admirable aggregate for concrete. Where good aggregates exist like slag, broken brick, sandstone, or furnace ashes, concrete building ought to be much cheaper than brick, as no skilled labor is required.

There is another consideration besides cost which tells in favor of concrete, and that is the non-porosity of walls so constructed. Not only does brick absorb moisture in wet weather, but it is now known to absorb animal gases as well; and here we have a condition which builders of our hospitals and infirmaries ought to be reminded of. We are not sure if concrete has been applied to any buildings in England of this kind on a large scale, but as absorbent walls are

known to be injurious in harboring the germs of infection, the value of walls constructed of concrete, made of burnt aggregates, cannot be overrated. Slag-made concrete has the great advantage of being fire resisting, the material in its rough state having been subjected to intense heat. There is nothing in it to "kill" the cement, and the rough surface of walls built with it becomes an excellent "key" for the plastering. In the construction of walls of this material, three sizes of the slag may be used; the larger lumps being packed in layers in the middle of the wall, and the other two sizes, the larger of the size of walnuts, run in with cement on each face in the proportion of eight to one.