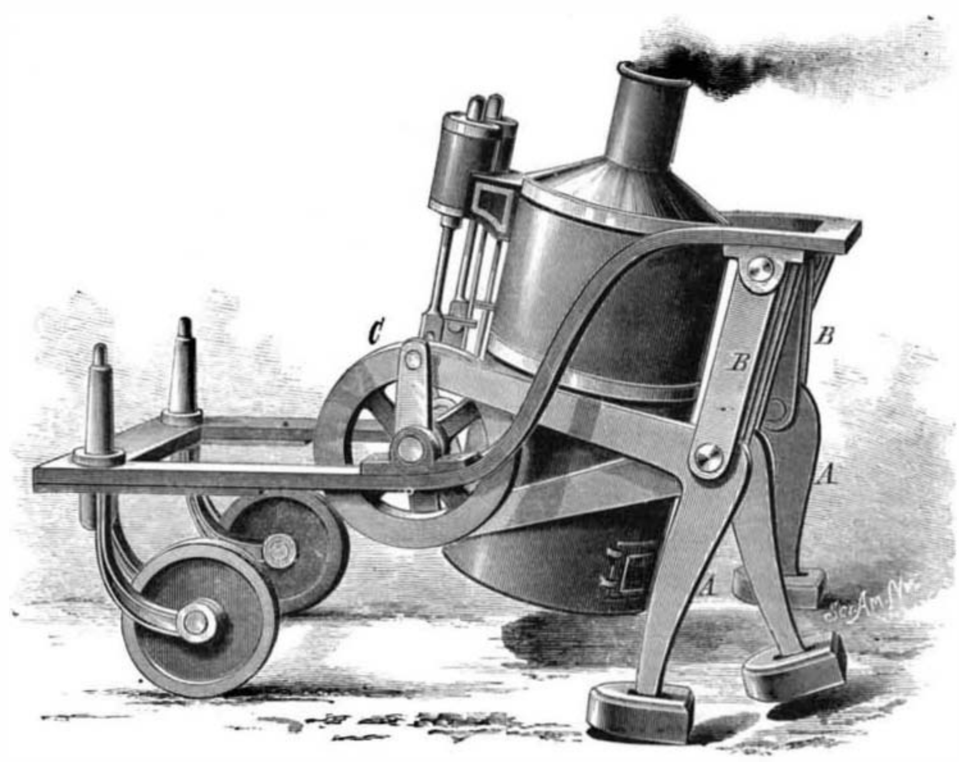
NOVEL TRACTION ENGINE.

The curious motor illustrated by the accompanying engraving is really a steam horse having four legs, and behaving very much like the veritable animal which it is intended to replace, in so far as the manner of its locomotion is concerned. Two right angled levers, A, are jointed to bars, B, which swing on a shaft extending across the rear end of the main frame carrying the boiler and engine. The front end of the main frame is supported upon caster wheels which are free to turn in any direction in a horizontal plane.

There are four of the jointed legs, A B, two upon each side of the boiler, and the forward ends of the right angled levers, A, are connected with cranks on the engine shafts. Each pair of legs has its separate engine, and the cranks driving each pair are oppositely disposed, so that the legs move alternately in opposite directions. Each leg is provided with a foot having an outer metal part and an inner elastic rubber portion moulded on an enlarged portion of the ends of the legs. The rubber forms a cushion which gives elasticity to the step, and prevents jarring.

The guiding of the motor is accomplished by increasing or diminishing the speed of one or the other of the engines. When walking, each pair of legs will be alternately lifted from the ground, carried forward, and placed upon the ground, there to remain while the motor is carried forward one step, when it is again lifted, and so on. The inventor of this novel machine is John E. Praul, of the U. S. Navy, stationed at Washington, D. C.

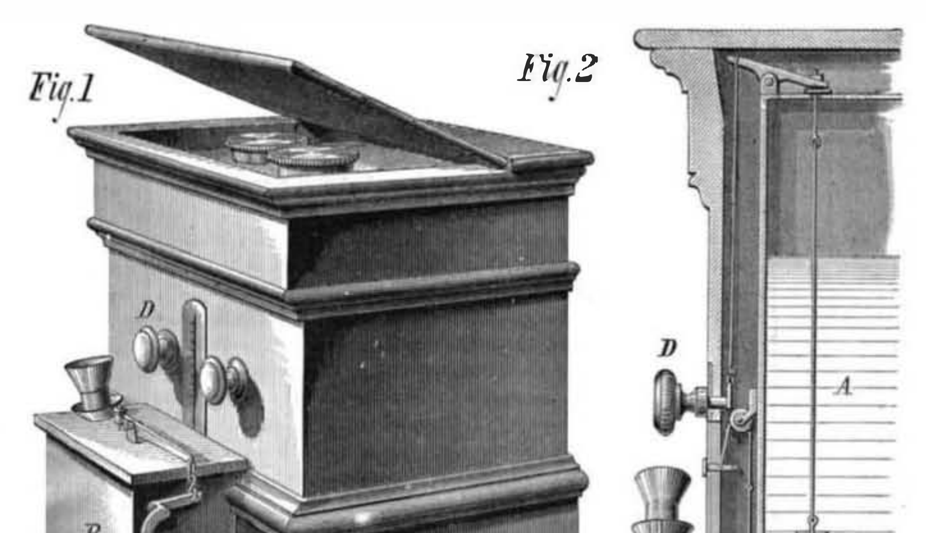


PRAUL'S TRACTION ENGINE.

IMPROVED OIL CABINET.

The engraving shows, in perspective and vertical section, an improved liquid cabinet recently patented by Mr. James M. Thayer, of Randolph, Mass. This cabinet was originally intended for the use of dealers in kerosene oil and similar liquids, but the inventor finds it admirably adapted to the use of druggists for containing spirits and other volatile or inflammable liquids; it is also suited for use in private families for holding oil or any other liquid consumed in the household, as it prevents evaporation and confines the odors, and renders explosions impossible.

The device consists of a metallic tank, A, and a measure, B, mounted in a suitable wooden case and provided with valves for controlling the escape of the liquid, and an indicator for showing the amount of liquid discharged from the measure. The case which contains the tank, A, has a lid which is raised when the tank is filled. The valve, C, at the bottom of the tank, discharges into the measure, B, and is controlled by a wire extending upward through the top of the tank and connected with a lever connected by a wire with a short arm on the spindle of the knob, D. The measure, B, contains a float, E, from which a rod extends upward through the top of the measure, and is connected with a cord that runs over a pulley and is attached to an index which is free to move up or down in front of a scale graduated to represent the gallon and its parts. This device indicates the amount of liquid admitted to the measure. In the bottom of the measure there is a valve, F, the stem of which extends through the top of the measure, and is connected with a lever which is operated by a crank at the end of the measure. The valves, F and C, are held to their seats by coiled springs, and under the valve, F, there is a drip cup for receiving any oil that may drip from the valve after it is closed. When it is desired to discharge the liquid from the measure a metallic tube is placed between the receiving vessel and the valve before the latter is opened. When the tube is not in use it is placed in a drip cup formed in the top of the measure. The cabinet may be provided with one or two tanks, and when it is used by the consumer of the oil or other liquid, the measuring device may be dispensed with.



THAYER'S OIL CABINET.

Locomotive Engine Driving.

At a recent meeting of the members of the London Association of Foremen Engineers and Draughtsmen, Mr. Michael Reynolds read a paper entitled "Practical Notes on Locomotive Engine Driving," extracts from which we take from the *Railway Review*.

He said a man might be a first class mechanic, and yet not capable of taking charge of a locomotive under steam, moving at the rate of eighty-eight feet a second. On the footplate the eye was trained to distinguish colors at a distance, and the ear learns to detect the slightest variation in the four beats of the two cylinders. It was only under steam at high speed with a train that a locomotive engineman had the advantage over a stationary engineman. On railways there were coral reefs and sand banks. There were all kinds of traps, including points, sidings, and gullets, and if the driver did not know these, he was sure to fall a victim to one of them. These trappings were sometimes of a most expensive character. The rank and value of an engineman was exactly in proportion to the labor and study he had bestowed on the subject of traps. The first class locomotive driver was always the same when at work, because he acted upon well based rules. If the locomotive driver adhered strictly to the rules laid down, there was no fear of anything going wrong, and it was necessary that he should, on entering upon duty, see what water was in the boiler. Many drivers were satisfied by looking at the gauge glass, and not by actual fact. It was only by opening the gauge cocks that a driver could be positive as to what water was in the boiler. It was necessary to see that these gauge cocks were in working order, for he knew of an instance where two experienced drivers were instantaneously killed through a gauge cock glass not working, and when the attempt was made to shut off steam, the signal being against them, it failed, and the train dashed into two horse boxes and a pen wagon. It was astonishing what little failures had done in the way of upsetting the working of a large traffic, not to mention the inconvenience suffered by passengers. The experienced engineman put his locomotive through certain trials before it left the shed, as it was better for the defect to be found out then rather than when the train was going at full speed. Unless the fire was properly constructed and well burnt through it would be found difficult to keep time, especially if the train was going against a side wind and drawing a heavy train. On some of the English express trains the average speed was fifty miles an hour, and in order to keep time the engines must run at some parts of the road seventy or eighty miles an hour. He had traveled at eighty-two miles an hour, and only arrived to time.

He then described the different kinds of coal that should be used by enginemen, and warned them of the inferior quality, which was apt to deceive the driver. He added that broken firebrick should also be put into the fire box, as it prevented coal from falling out, and excluded the cold air. The oiling was generally done by the driver on the inside of the engine, and the fireman did what was necessary underneath. The history of locomotive failures showed that at least two thirds of these occurred through preventable causes, and which would have been avoided had the engineman systematically examined the locomotive. Every engine failure was the result of one of two things. It was either a deviation from what the builder intended, or a deviation from perfect engine driving. It was always the case that a first class driver was a man of taste and judgment. After the engine had arrived at the end of its trip, it should be immediately examined, because if left till it reached the shed, which might be an hour or two later, then what was formerly hot would be comparatively cold, thereby deceiving the engineer. From the start to the finish of a journey everything demanded close attention, and there was not a body of men in England who tried to give satisfaction like the brave enginemen of the iron horse.

After some discussion on the advantage or otherwise of making drivers practical mechanics and scientific men, the chairman said the question was fully discussed before a committee of the House of Commons about thirty years ago, when Mr. Brunel stated that locomotive enginemen ought not to be able to either read or write, and the more ignorant they were the better, for they would make themselves part and parcel of the engine. That opinion, however, was not agreed to by the committee, and Mr. Brunel found himself in a miserable minority, as it was the general opinion of the members that drivers ought to be thoughtful and trustworthy mechanics—such was his own opinion also.

Steam Jet Signals.

It is curious that no use has been made of the fact that when a strong ray of light is thrown upon a jet of steam issuing forth into darkness the steam becomes brilliantly illuminated, and the light thus transmitted is visible from long distances. The example of this, frequently seen in the steam issuing from a locomotive engine at night, when the driver opens his fire door, has not been lost, for, taking advantage of this principle, M. Carl Otto Ramstedt, late of the Russian Navy, has devised a system of night signaling on board ship, with which some experiments have recently been made by the Trinity Board. The apparatus consists of a dished chamber, in which the inventor burns strontium or other substances so as to produce a variety of colors if desired. At the back of the chamber is a reflector, by means of which the light is thrown on the steam either steadily or in flashes at will. The steam thus becomes a luminous mass, varying in color with the substances used in combustion. The result of the experiments recently made showed it to be very effective and applicable to its intended purpose, and there appears to be little doubt that it will prove of value as a means of signaling at sea.

TO SOLDER TORTOISE SHELL.—Bring the edges of the pieces of shell to fit each other, observing to give the same inclination of grain to each; then secure them in a piece of paper, and place them between hot irons or pincers; apply pressure, and let them cool. The heat must not be so great as to burn the shell; therefore try it first on a white piece of paper.