Machinery and Tools as they are.—The Steam Engine.

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LAND ENGINES—The constructor of land engines has more opportunity to develope the economical working of steam than the makers of locomotives and engines for steam vessels who are cramped by the restrictions imposed upon them from the character of their work. It may be asked,—by what standard is the excellency of a stationary engine to be determined? To this the answer is plain, it is determined chiefly by the amount of duty performed by a given quantity of fuel,—a circumstance influenced greatly by the boiler, but also affected by the construction and management of the engine. Stationary engines are now generally non-condensing, the primary expense being less, and the machinery more simple, although where economy of fuel is of great importance the condenser is still retained.

It is a common mistake to suppose that a high pressure engine is necessarily non-condensing, a mistake which will be corrected by a knowledge that the expression "low pressure" is now applied to steam that a few years since would have been considered far too high for a condensing engine. Thus 4 lbs. per square inch above the pressure of the atmosphere in British marine boilers was thought sufficient, whilst at present it is not unusual with them to use steam at 14 and even 16 lbs. per square inch. But stationary engines are worked at a much higher pressure, and too often the advantages derived from expansion are neglected, although it is when the steam is at a high pressure that the benefits of expansion are most available.

The engines used for the Cornish mines in England have attained some celebrity, owing to their economical working, the steam being expanded from about one-sixth of the stroke, when, by the evaporation of about one pound of water, they are capable of raising 120,000 lbs. one foot high; whereas, a low pressure engine, with the same evaporation, and steam cut off at one half of the stroke, raises only 33,000 lbs. the same height. Perhaps the best construction for a land engine, when it is desired to use the steam expansively to its full extent is to admit the steam freely into a small cylinder during the whole of the stroke, but on leaving this cylinder to allow it ingress into a larger one, where it expands before its escape into the condenser.

The oscillating cylinder is much employed for small land engines, as it affords a cheap substitute for the slide valve, if formed in the usual manner, by which one of the gudgeons or trunnions is made to regulate the entrance and exit of the steam, while the other gudgeon or trunnion can be employed to work the feed-pump. The favorite construction for land engines throughout the United States is that in which the cylinder is placed horizontally on flat beds, on these latter are secured the guide bars, main plummer blocks, &c. When this is not the shape, we generally find that compact form employed in which a vertical cylinder is placed on a pedestal, while the cranks below are worked by side rods. Small portable engines for agricultural purposes are now being rapidly introduced, in which case the boiler generally is cylindrical with internal fire-place, and the engine placed on the top of the boiler which is fixed on wheels so as to be drawn by horses. The diameter of the cylinder is, in general, about 7 or 8 inches, and it has been found advisable to encase the cylinder, steam pipe, and pump, either in the smoke-box, or some other part capable of protecting them from the frost.

No part of the stationary engine has lately been subject to more modifications than the governor, to supersede which a water-regulator is now often used, a variation from the usual form of the governor was on exhibition at the last Fair of the American Institute, and was mentioned in our report at that time. It is often also constructed in a rather original manner, consisting of a single hollow ball encircled by a zone, there is an opening through the under side to admit an upright spindle, which is attached to the ball by a joint in its centre. One side of the ball and zone is heavier than the other, and consequently, when at rest or moving slowly, it hangs down, but when driven fast the centrifugal force of the heavy side overcomes its gravity, and the zone assumes nearly a horizontal position. When this is the case a small link inside the ball lowers the usual brass collar on the spindle, and thus shuts off part of the steam until the gravity of the ball overcomes the centrifugal force, when the throttle-valve will re-open.

We have mentioned the efficiency of the Cornish pumping engines, and comparison shows many points of resemblance between them and the American engines for river steamboats, which latter are so renowned for their performance. The great width of our rivers has been favorable to the system of placing the machinery on deck, which has, by this arrangement, allowed the use of a stronger boiler than is attainable when the engines are below. The striking peculiarities of the American boat engine are visible at the first glance: the trussed beam overhead, the long stroke, the large paddle-wheel, and particularly the arrangement of the cylinder valves, all different from those of the sea-going vessel. It is, however, remarkable that one of the most eminent English machinists has lately departed from his usual practice, and has used, instead, the American system of valves in a marine engine of 400 horse-power. Nor is this, we believe, a solitary instance, the same arrangement having been also lately applied to one of the new steamers belonging to the English West India Steam Co.

Some improvements on the ordinary double spindle valves have also been introduced by a modification of the double beat valve; this is intended to remedy the springing to which the former are occasionally liable. The mode in which the valves are worked, is well known. There are two rock-shafts, one for moving the steam valves, and the other for the exhaust valves. These shafts are worked by separate eccentrics, and give motion to the lifting rods by means of projecting arms, an arrangement that admits of any desired expansion, sometimes only one rock-shaft and eccentric are employed. The expansion is also frequently regulated by having a cut-off or expansion valve placed in the steam pipe like a throttle-valve.

(To be Continued.)

For the Scientific American.

Railroad Dust and Cinders.

During an excursion made the past summer composed partly of a thousand miles of railroad on seven different routes, in Pennsylvania, Ohio, New York and New Jersey, the excessive annoyance caused by the dust and cinders, led me to contriving some means for the abatement of so great a nuisance, and I now offer you my suggestions in the belief that whoever shall accomplish such an object will greatly promote the comfort and pleasure of the travelling public, and also benefit the railroad companies, by inducing many to travel, who having once made the experiment, have concluded, like myself, that necessity alone would lead them to repeat it.

I would attach the apparatus to the tender of the locomotive, which should be made of the same length as the passenger car, or about thirty feet. Around the bottom of it, and enveloping the running-gear, I would place a tight apron of sheet iron, extending down very nearly to the level of the rails. This would form a large box, having the apron for its sides and ends, the body of the car for its top, while its bottom would be the surface of the earth. Into this box the exhaust steam is to be conducted by a large hose of sail-duck or other material. Immediately the steam expands over the surface of the ground, which, being parched by the rays of the sun, is in a suitable condition instantly to absorb a portion of the watery vapor in contact with it. And the more finely the earth is pulverized the more rapidly absorption will take place, so that in the space of one second and a half, a sufficient quantity of moisture will probably be received to prevent the dust from rising. This is about the length of time each particle would be exposed to the action of the vapor, with a car thirty feet in length and a speed of thirty miles an hour. A shorter car might answer with a higher speed, but experiment only can determine this point. The principle is simple—to bring the steam into quiet contact with the dust over an extended surface. The connecting hose should enter the box in such a manner as to project the steam horizontally along the bottom of the car, from which it will descend without any violence of motion, and escape quietly between the lower edge of the apron and the ground. The smoke and cinders being forced along in company with the steam, will no doubt be thoroughly condensed and extinguished, and deposited between the rails, instead of being discharged above to vitiate the atmosphere. The ordinary spark-catcher will be dispensed with, and perhaps even the pipe—a connection only being required with the duster box. Advantage might also arise from the moistening of the rails behind the locomotive, causing an important diminution of resistance to the train, while it does not impair the tractive power of the engine.

The above general description will enable any interested to test the plan, and having myself no connection with mechanical pursuits, I offer it to your valuable journal as the best means of bringing it under the notice of such, with this remark, however, that I have no intention of taking a patent, not doubting that if successful, those companies adopting it will take pleasure in gratifying the small privilege I shall ask in return. J., Jr.

Air Heating Pipes.

The apparatus for heating air for blast furnaces as at present employed is liable to objections which have been obviated in an improved arrangement by Jesse Young, of Franklin Furnace, Ohio, who has taken measures to secure a patent. The improvement consists in the use of circular pipes, which communicate with and are supported on each other by means of hollow pedestals (one pedestal to each pipe), which are placed alternately at opposite ends, so that the air passes all round the pipe before it arrives at the pedestal.—The air is admitted by an opening in a rectangular-shaped air-chest, which likewise serves as a base, supporting it altogether on similar hollow pedestals. The whole apparatus is fixed horizontally, which is considered by the best authorities upon the subject as a preferable method to having the pipes in a vertical position. The only objection is that they are liable to break when placed in this manner from exposure to the intense heat; this defect the inventor has ingeniously prevented by the use of the hollow pedestals which, as well as supporting the weight of the pipes, counteract the effects of the heat by the current of cold air circulating inside.

Cure for the Croup.

Dr. Forbes, of Boston, relates, in a late number of the Medical Journal, a case in which a severe attack of croup was cured by the application of sponges wrung out of hot water to the throat, together with water treatment, which he describes as follows:—

"Soon after making the first application of sponges to the throat, I wrapped the child in a woolen blanket, wrung out in warm water, as a substitute for a warm bath, and gave twenty drops of the wine of antimony in a little sweetened water, which she swallowed with difficulty. I persevered in the application of the hot, moist sponges for an hour, when the child was so much relieved that I ventured to leave it.

These applications were continued through the night, and in the morning the child was well.

Ancient and Modern Cities.

We are apt to consider London as a considerable city, and New Yorkers regard their village as an immense municipality. But if the Mayors of Nineveh and Babylon could revisit the earth they would laugh at the pretensions of the moderns. The area of Babylon was two hundred and twenty-five square miles, and that of Nineveh two hundred and sixteen square miles, while that of London and its environs is but one hundred and fourteen square miles.

Chickering's Pianoforte Manufactory.

The above building was lately destroyed at a fire in Boston, by which the owner has been a great loser, but Mr. Chickering's loss is not to be measured by money: the patterns, the scales, and all the drawings, which have been the result of his long experience and close calculations,—the work of many an evening hour of patient thought, have all been destroyed in a night. One instrument in particular will be a great loss. For a year past Mr. Chickering has been engaged in planning and constructing a new piano, which would possess many advantages over those now used in parlors. He had spent weeks and weeks upon its preparation, and had got it so far completed that in a day or two it would have been ready for exhibition. This instrument, with all its patterns and scales, is destroyed with the rest.

Agriculture in California.

At the last meeting of the Farmers' Club of this city, Mr. Shelton exhibited some specimens of the Amole or Soap Plant used by the natives for washing purposes. It resembles the onion and is propagated from off-shoots, constant use of it, however, inflames the hands. From the fibre of the plant an excellent article of hemp could be made. The cultivation of the onion had been attended with the most triumphant success. The same might be said of the beet, which grew to an enormous size. It would be no exaggeration to say that beets weighing one hundred pounds each could be grown in California.—In the places were the largest beets were raised, it should be remarked that the subsoil was moist. The sycamore and buttonwood trees grew with great luxuriance in all parts of the country—as also the ash and alder. But there were many varieties of trees in California unknown in the Atlantic States. He had not noticed any species of elm or sugar maple, though there was, however, a very valuable sugar-producing tree known as the sugar pine, which grew to a great size and produced good timber; in appearance it was similar to the long cone pine. The general planting season throughout the country was in March and April—gardening operations commencing in February as here.

Rev. Mr. Fitch observed that he had discovered, during his journeyings in California, some six varieties of gooseberries superior to any he had before seen. The blackberries and strawberries were much superior to anything we had, and the latter were even superior to the English strawberry. There was also a berry of very delicious flavor, something between the raspberry and the blackberry, which was called the salmonberry.—That name was given it by the Oregonians, who observed that the berries which fell from bushes overhanging the rivers were eagerly devoured by the salmon.

The Chairman observed that he had made a good deal of inquiry relative to the cultivation of the grape in South and North America west, and from what he ascertained on the subject, it appeared there was no grape that was worth anything cultivated in those regions that was not of European stock.

Rev. Mr. Fitch corroborated the statement, remarking at the same time that there was no native grape in California worth cultivation.

Burns and Spontaneous Combustion.

The value of linseed oil and cotton, for burns has long been known. Here is a case of its use, which shows the danger of binding it too closely, when placed upon a wound: a child, in Fredericton, N. B., a short time since, burned its leg against a stove; the mother immediately applied linseed oil and cotton-wool, with a tight bandage over all; in a short time the screams of the child induced the mother to remove the bandage, when it was discovered that the cotton-wool had taken fire and had considerably increased the size of the burn. The reason of this spontaneous combustion was the free exposure of the oiled surface to the atmosphere. Oils and grease spread over an extensive surface, and exposed freely to the atmosphere, oxydize so rapidly as to engender great heat, and ignition, producing what is termed "spontaneous combustion." Oiled cotton put on burns, or used for any purpose, should be secluded from the atmosphere.

The Postmaster General in his report states that "the service between New York and Washington, though much improved, is still defective and unsatisfactory. The endeavors to improve this service, have been rendered abortive by a want of unity among the railroad companies running between Philadelphia and New York. These railroads are the Jersey ones then; what an accommodating set they must be.