Care of Machinery---Safety of Workmen.

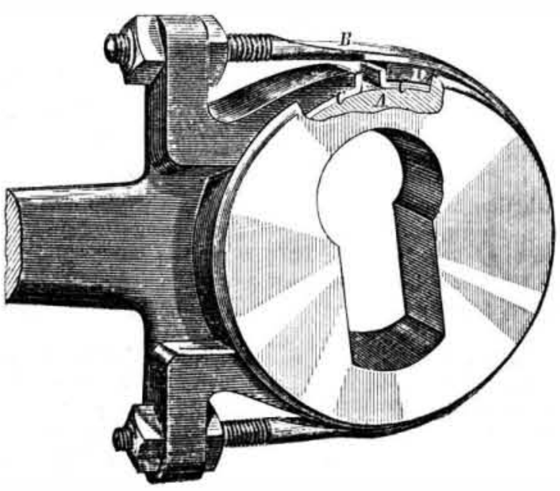
"Where is your engineer ?" we inquired recently of some workmen as we stood by a thumping engine and a dirty boiler with two rusty gage cocks. "Oh! the boy you mean; he is playing around somewhere," was the answer. Leaving the youth to enjoy his frolic, we examined the machinery that had been consigned to his charge and watchful care. On finding that water issued from the top gage cock, we felt easier. We then looked for a steam gage, and lo! far back on the top of the boiler, we descried a dingy looking dial upon which with our best eye glasses, we failed to discern any indicating pointer or figures. We then explored for the safety valve, and found it safely covered with an accumulation of coal and sawdust, and out of the reach of both anxious inquirers and boys. But here comes the boy engineer. The fire doors are flung open, all the fuel that can be stowed away is thrown into the furnace, bang go the doors again, and he is off to finish his game. We subsequently learned that there were three rented workshops with machinery driven from this engine and boiler, and that the latter was second hand when it was put on the premises. A short distance from these works, we found another boy engineer in charge, and the machinery gradually wasting away from hard knocks, cold neglect and old age. "Why does not your landlord employ a competent and careful engineer who would keep his machinery in repair?" we again asked, and smilingly added, "You would feel safer if he did." "Oh, he says he cannot afford it," was the answer. Here, then, were second hand boilers, boy engineers, machinery out of repair—all tolerated on the plea of want of means. It is no wonder that the workmen in those buildings scold the boys, but despise the landlords who cause their lives to be put in jeopardy ten hours every day. These are not "fancy sketches," but the state of things as they actually exist in the instances described; and we too frequently find the same condition of things in all parts of the country. The condition of machinery in many of our manufactories is disgraceful, not to say dangerous. We write this from no hearsay; we know it from daily personal observation. Owners of machinery, in nine cases out of ten, pay high prices for their "power;" but when they have got their machinery in running order, they seldom employ a competent engineer, but get some raw hand or "smart boy" who thinks he can "fire and run an engine." They claim that neither their profits nor their business will allow them to pay high wages for running their machinery; but after a few accidents, for which they have to pay handsomely, they learn the economy of keeping their mechanism in repair, and employing reliable and competent persons to run their engines. We maintain that it is as much a duty of a manufacturer to examine or to have examined daily the state of his machinery, from boiler to journal, as it is to inspect and examine his wares. Are not lives as valuable as property? Is not the health of an employé of as much consequence as a bale of goods? And yet we see dirty and greasy floors in the engine room; the examination of the safety valve often requires the use of a lamp; pipes leak steam and water; bearings are without drip pans; belts are without guards, and occasionally send a patient to the hospital; steam pipes are rusty for want of paint; rooms are hot and poorly ventilated; the machinery is crowded; the passages are narrow; windows are unwashed; light is limited; grease and dirt are plentiful, and noise from unrepaired machinery adds to the general discomfort. We charge the whole of such neglect and carelessness on proprietors, because if they would employ intelligent and competent assistants who understood their business, and took a pride in the care and appearance of machinery, there would be a vast difference in the general neatness and good appearance of the works. In addition to this, a salutary influence would soon be observed in the health, conduct, and feelings of the employés. We could enlarge upon the advantages which would result from manufacturers enforcing thorough cleanliness, constant watchfulness, frequent examination, and immediate reports of all and everything that gets to be dangerous about their machinery, or that requires repair; but the good results accruing from such regulations are apparent to every mind. We close by simply remarking that in instances where investigation, thorough and complete takes place, and where machinery receives the attention it demands, there we notice an amount of satisfaction and honorable pride on the part of both employer and employés.—*Technologist.*

The Poisonous Qualities of Chromate of Potash.

A professor of the University of Charkow recently fell a victim to poisoning by neutral chromate of potash. M. Neese complains that up to the present time the poisonous qualities of the chromates are not perfectly understood, and proposes as an antidote the acetate of lead. Neese himself acknowledges, however, that the antidote may produce worse results than the poison itself, and requests toxicologists to point out an effectual remedy. The ignorance in regard to the poisonous qualities of this substance is, however, not so great as M. Neese supposes, for already in 1853 Jaillard, in the *Gazette des Hôpitaux*, called attention to the danger in using it. The physician must be very careful in the employment of bichromate of potash; a dose of 0·25 gramme was sufficient to kill medium sized dogs in from two to six days. Jaillard himself took 0·12 gramme, and observed with small doses dangerous symptoms. Most of the organic substances, particularly the hydrates of carbon, such as sugar, alcohol, and the organic acids, decompose the chromic acid into oxide of chromium; this is particularly the case with tartaric acid, which Frederking has proposed as an antidote against poisoning with chromic acid. The decomposition of tartaric acid, unless it is very much diluted, takes place in about one and a half minutes, chromate of potash and carbonic acid being formed. It will still be necessary to try this antidote on living beings.—*Photographische Zeitung.*

FOWLER'S IMPROVED METHOD OF ADJUSTING ECCENTRICS.

The object of this improvement is to obviate rattle or jar in the working of eccentrics, wherever used on steam engines, rub rolls, comb drivers, or any other machinery; and also, whenever the parts wear loose, to enable the wear to be taken up by means of the screws and nuts at the end of the strap. The method of accomplishing this is shown in the accompanying engraving.



The eccentric strap, B, extends from two lugs formed on the connecting rod about the eccentric, A, as shown, the ends of the strap passing through the lugs and being threaded to receive the tightening nuts.

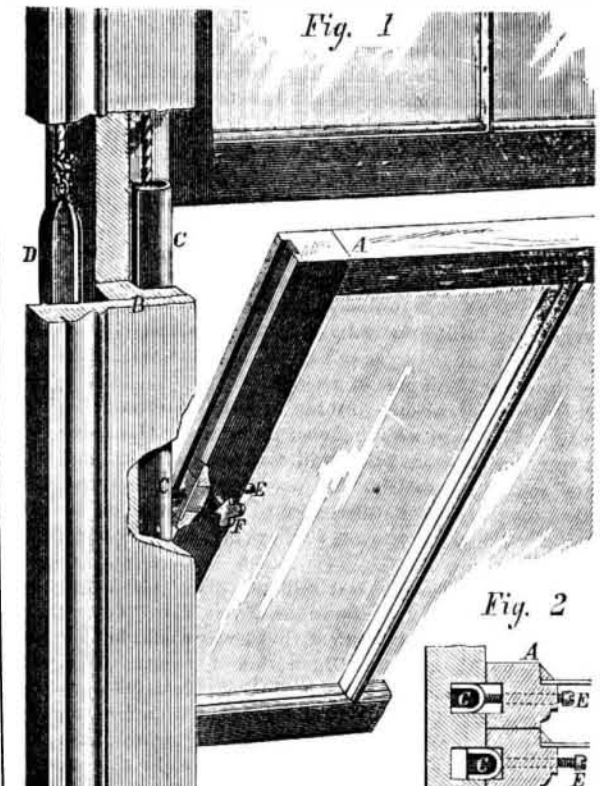
C is a wearing plate which underlies the eccentric strap on the half circumference opposite the eccentric rod.

Between the eccentric strap, B, and the wearing plate, C, may be placed a pad of leather or other suitable material, if desired, which adds to the delicacy of adjustment, and aids in accomplishing the ends sought.

Patented June 1, 1869. For machines or rights address Geo. Fowler, patentee, Philmont, N. Y.

NELSON'S REVERSIBLE WINDOW SASH.

Every housekeeper will appreciate the want supplied by this improvement, by means of which windows can be cleaned both inside and outside, in cold or warm weather, without



standing or sitting outside on the sill. For weeks during the winter, the ordinary window cannot be cleaned, because ice and snow cover the sill. Besides, it is tedious to have the water bucket inside, when the cloth needs a fresh supply, and the window must be raised to get in the room to rinse and replenish, proving an annoyance and source of constant slopping on carpet and wall paper.

In the arrangement illustrated, the sash can be turned completely over, washed from the inside of the room and turned back when done, so that no danger is incurred, and no draft created.

The frame, B, Fig. 1, and the sashes, A, are grooved to receive a guiding bar, C. This bar is of metal, rolled into gutter or U form, which makes it light and strong, and leaves a groove for the weight cord, which is fastened near the center by knotting, and slipping into a casting, shown in Fig. 2, as in ordinary wooden sashes. When the window is in customary position, the guide is partly in the sash, and partly in the frame, sliding up and down with the sash, and completely stopping any draft.

Fig. 2 exhibits a portion of the sash, part of the pivot casing being cut away. This shows the pivot, E, passing through the sash, and screwed into the guide, C. Inserting the key, F, which fits screw threads formed on E, the guide is thrown entirely out of the sash and into the frame by turning the key, leaving the window free to turn over. When turned over, the key is again inserted on the other side (the keyhole passing through the sash), the guide drawn back again, and the window is held steady, leaving both hands free to handle cloth and bucket. A spring, G, fits into the screw threads, and holds it wherever left, making it at all times perfectly secure. When the key is inserted, it throws the spring out of action, allowing the pivot to move back and forth. But one key is necessary for the whole house. The upper sash being fitted in the same manner, by throwing all the guides out at once the sashes readily pass each other, and no draft is created, and no extra fire needed on cold days when cleaning.

The guides can be used either with or without weights, D, and with sashes containing one, two, or more lights, as shown in the engraving. Old windows can be fitted by grooving the sash and frame. The window thus made costs but a trifle more than the ordinary frame, as no stops or beads are used, the guides acting as draft obstructors; and the strength of the sash is undiminished, the groove being but one fourth of an inch deep by five eighths of an inch wide, and the pivot three eighths of an inch in diameter, the head coming just inside the glass; while the saving in health fuel, time consumed in cleaning, etc., would, especially in hotels, etc, repay ten times the cost. To take the sash out it is only necessary to unscrew the pivots, E. To replace a pane, however, or to paint the sash, it can be turned over as when cleaning.

Patented June 6, 1871. For further information, rights to manufacture, State rights, etc., call on or address the inventor and patentee, W. P. Nelson, 618 N. Main street, St. Louis, Mo.

Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Mechanical Equivalent of Zinc.

To the Editor of the Scientific American:

As I have now my hand in it, I may as well go on and answer Mr. Paine's arguments found under the above head on page 36. I hope Mr. Paine will return the compliment and also answer my arguments found on the same page, so as to keep up a crossfire for the instruction and amusement of the readers of the SCIENTIFIC AMERICAN, and for the edification of "the gentlemen associated with him," the stockholders in the new electric company, the ups and downs being the only thing needed now, as it is bound to be the *finale* of the whole affair.

However, as Mr. Paine has come down from the absurd assertion of 67,000,000 foot pounds from 3 grains of zinc, made before, to the more reasonable claim 23,000,000 foot pounds from 33 ounces of zinc, I will not ridicule it this time, but consider it seriously, scientifically, and practically, for the instruction of all concerned.

The theoretical mechanical equivalent of zinc depends, as does that of all other combustible substances, chiefly on the amount of oxygen it is able to consume in oxidizing. The oxygen is here, as well as in any fuel engine, or in any animal power, the great motion-giving, or life-giving agent; and when we say that one pound of coal has the capacity to produce 14,000 units of heat, it is on the condition that this coal shall combine with two and two thirds lbs. of oxygen. Therefore, we may just as well say that the consumption of two and two thirds lbs. of oxygen with the proper amount of coal, produces the 14,000 units of heat; a view for which there is fully as much ground as for the ordinary statement, and which is besides sustained by the fact that the amount of heat produced, if not exactly proportioned to the amount of oxygen consumed, depends much more on this amount than on the amount of the combustible. So we find that the amounts of heat developed by the combustion of equal parts of zinc, sulphur, carbon, and hydrogen, are equal, respectively, in ratio, to the numbers 1, 4, 16, and 64, while the amounts of oxygen consumed, during combustion of equal parts, is respectively 1, 4, 10, and 32. Therefore, in place of saying that the potential heat is stored up in the combustible, we may as well maintain that it is stored up in the oxygen or its equivalent, the supporter of combustion (chlorine, bromine vapor, sulphur vapor, etc). This is a view which for many years I have defended in my lectures, and which I have only abandoned recently for the better information now in our possession, by the discovery of the latent heat of dissociation, which is the true origin of the heat developed during combustion, and which has cleared away the mystery which thus far always surrounded the phenomena of combustion and flame.