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AMERICAN INDUSTRIES.—No. 61.

THE MANUFACTURE OF STEAM APPLIANCES.

About a quarter of a century ago the accessories of steam boilers and engines were few and very crude, and little reliance could be placed on them; but within the last twenty-five years great strides have been made in improving and perfecting these articles. There are many patents for improvements and so-called improvements, but those of real merit are comparatively few. Among the prominent improvements which have proved their superiority by practical tests are those invented by George H. Crosby, the well known inventor of steam appliances.

The Crosby patents are owned and manufactured exclusively by the Crosby Steam Gage and Valve Company, of Boston. The career of this company, although by no means long, has been one of unprecedented success; this is mainly attributable to the merits of their products.

There is no class of instruments in use that require more ingenuity in design, care in manufacture, or accuracy in adjustment than those for indicating, measuring, and regulating the pressure of steam. Mr. Crosby, who is an experienced inventor in this class of instruments, and also a thoroughly practical mechanic, has been actively engaged in the business since boyhood, and gives his personal attention and supervision to the construction of all goods made in this establishment, conducting operations in a uniform and systematic manner, besides being constantly engaged in inventing new machines and improving those already in existence.

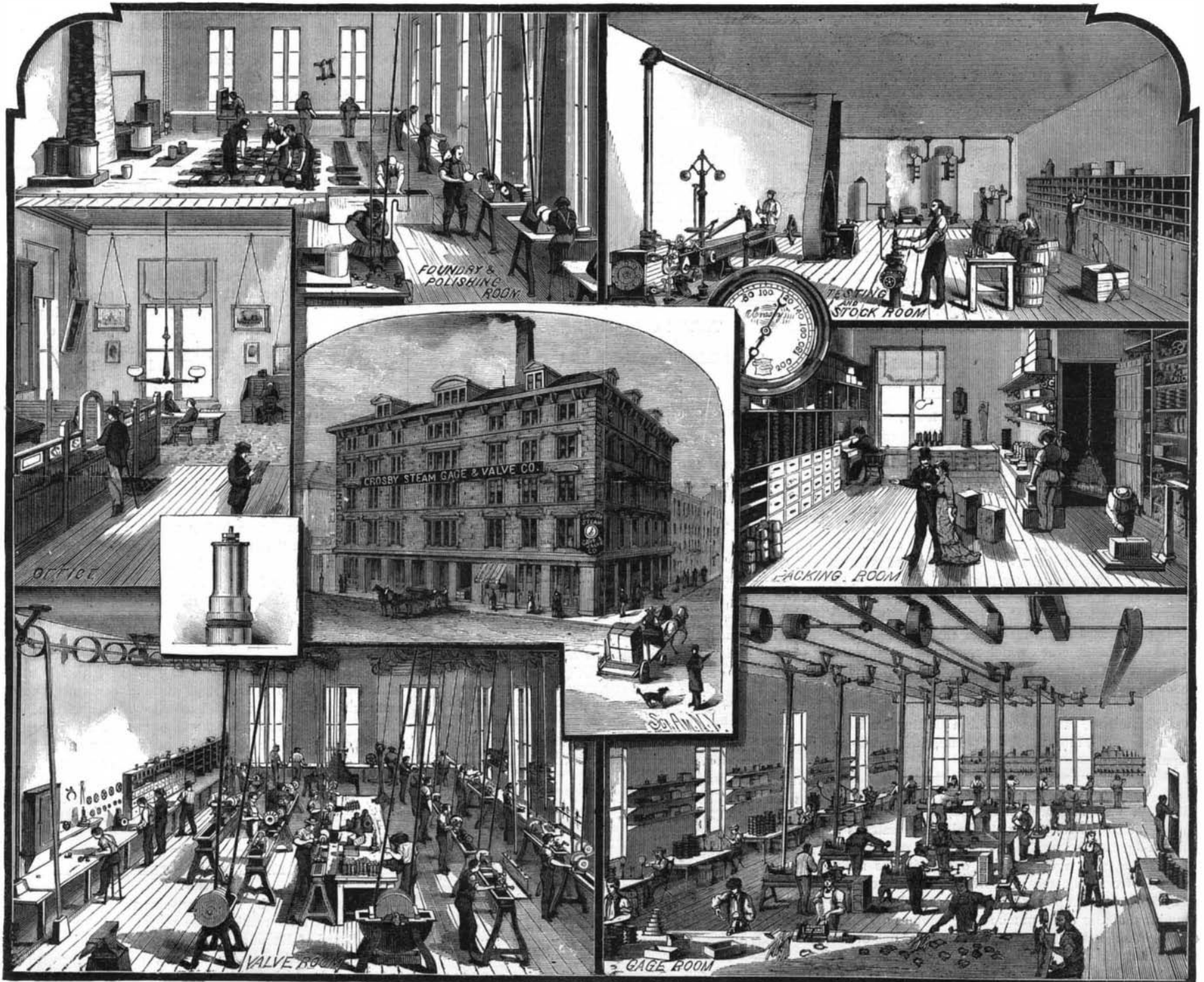
This company, full of energy and enterprise, has thoroughly introduced its goods and established a good reputation throughout this and foreign countries. Its success, considering that the business was started in 1875, when manufacturing was at its lowest, is remarkable. Its sales have steadily increased from year to year, consequently its manufacturing facilities have of necessity been correspondingly augmented by the addition of new and improved machinery, until a workman can now accomplish as much in one day as he formerly could in two. It is impossible for us in a necessarily condensed article like this to do justice to this establishment or the ingenuity and workmanship displayed in its products; it will suffice to give a short description of the prominent specialties which have been thoroughly tested and stand unexcelled.

The principle of the hollow elastic metal spring invented by Eugene Bourdon, of France, having been conceded to be the best upon which to construct pressure gages for durability, sensitiveness, and accuracy, was adopted; but the Bourdon gage as originally designed was only adapted for registering low pressure and vacuum, and it is still made by this company for these purposes. The Crosby improved Bourdon pressure gage is designed especially for high pressures, and does not possess the defects of the original Bourdon. By the peculiar shape and arrangement of the springs and the novel transmitting mechanism all the motion of the free ends of the springs is utilized, permitting the use of springs a hundred per cent stronger for the same pressures than can be used in any other gage, removing all danger of setting

under any pressure indicated upon its dial, and preventing any undue oscillation of the pointer. At the same time water in the tubes can return to the boiler as fast as it accumulates, thus preventing freezing during extreme cold. This gage has been generally adopted by railroads, builders of locomotives, portable and steam fire engines, and wherever high pressure is required. Gages are also made upon this principle for water works, with dials graduated for pressure per square inch and height of water in column; and for hydrostatic presses and hydraulic rams graduated for pounds per square inch and tons on ram. Various other combinations are made, such as pressure and temperature of steam, etc.

The Crosby adjustable pop safety valve has won for itself a reputation that reflects credit upon its inventor and manufacturers. Thousands are sold annually, and at the present time there is scarcely a railroad or builder of any class of engines that are not using or adopting them. This is a safety valve which is all its name implies, is automatic, certain in its action, prompt in opening and closing at the required points of pressure, and, we are assured, can be fully relied upon to relieve the boiler under all circumstances. The amount of reduction of pressure when open can be varied at will while under steam, from one pound to one quarter the pressure at point of opening. It is simple and durable, remaining, with fair usage, for years without deteriorating. They are made to correspond with the requirements, and are used on locomotive, portable, steamboat, stationary, and steam fire engine boilers, and for other purposes.

The Crosby self-regulating reducing valve was produced



THE MANUFACTURE OF STEAM APPLIANCES.—CROSBY STEAM GAGE AND VALVE COMPANY, BOSTON, MASS.

to fill an important want; and while taking as little space as an ordinary globe valve, reduces the pressure of direct steam, gas, or other fluid taken from a boiler or generator to a less pressure in the pipes or apparatus. It is used for manufacturing or heating purposes, and maintains the prescribed pressure constantly, notwithstanding the variations that may take place in the boiler above the pressure required. It can be readily readjusted, and a steam gage attached at top indicates the pressure which the valve is supplying. It is much used in distilleries, refineries, paper mills, bleacheries, and for reducing and regulating the pressure of steam supplied from boilers or street mains to houses, and steam heating in general, or wherever a constant unvarying pressure is required. It works without stuffing boxes, or rubbers, and their claims as to its qualities and capacity seem well founded.

Their steam engine indicator is one of Mr. Crosby's later productions, and is designed to obviate the difficulties heretofore thought to be insurmountable, caused by the adoption in engines of increased speed, great pressures, and high grades of expansion. By means of this instrument the internal working of a steam engine may be determined. It is a well known fact that the high state of excellence of the steam engine of to-day is due mainly to the information afforded by the indicator. When the Crosby indicator is properly applied, and its indications intelligently read, they may be implicitly relied upon even when the engine is running at the highest practicable speed. This statement is verified by the testimony of the leading experts of the country, and mechanical engineers and experts who were already fully equipped with the best the market then afforded are being supplied with the Crosby. The polar planimeter for measuring indicator diagrams in its most perfect and complete form is in process of manufacture by this company.

The Crosby safety water gage is a simple contrivance attached to an ordinary glass tube water gage without altering its external appearance, but removes all danger of scalding. Its action is so complete that upon the sudden breakage of the glass tube no steam or hot water is perceptible other than that contained by the tube at the time of breaking.

Their steam cylinder lubricator, it is said, is without a rival as to its effectiveness, economy, and reliability. It embraces the remarkable feature of sight feeding in drops, which enables the engineer to set the proper feed at once, relieving him of the necessity of guessing the rate at which it is feeding, or whether it is feeding at all. The oil is seen passing to the engine in drops, and may be regulated to deliver even less than one drop per minute, while uniform and certain action is still secured.

The Crosby low water alarm works automatically and efficiently without the use of fusible plugs, floats, cranks, springs, or moving machinery, and no part need be removed to fit it for work again after its action. It is very simple and reliable.

The "Bay State" muffler, also made by this company, is for the purpose of reducing to its minimum the harsh and disagreeable noise occasioned by the escape of steam from steam pipes and safety valves without hindering the free outflow of steam.

This company is also engaged in the manufacture of various other standard instruments, such as engine revolution registers, marine clocks, test pumps, test gages, salinometers, thermometers, pyrometers, whistles, etc.

The officers of the company are: J. H. Millett, President; Geo. H. Eager, Treasurer; Geo. H. Crosby, Superintendent; and their place of business is at corner Milk and Battery-march streets, Boston.

A Large Holtz Electrical Machine.

Messrs. J. and H. Berge, of this city, have just completed a very large and finely constructed double plate Holtz electrical machine for E. N. Dickerson, Esq. This is probably the largest Holtz machine ever made, the revolving plates being forty five inches in diameter, and other parts in proportion.

By means of a continuous charging apparatus attached to the machine the inductors may be readily charged without recourse to the cat-skin and rubber plate. The machine, together with the charging apparatus, is mounted on a massive mahogany table, which is sufficiently large to support any apparatus used in experiments. By an ingenious arrangement of mechanism the crank which rotates the large plates is made to turn the charging apparatus. This machine is capable of yielding a 26-inch spark, accompanied by a report that is really startling.

By way of contrast, this firm exhibit a diminutive Holtz machine having a 5-inch revolving plate, and yielding a 1-inch spark.

Digestive Ferment in the Fig.

M. Bouchut, who has been investigating the digestive principle of the papaw tree, has extended his researches to the common fig, and the result of preliminary experiments (Comptes Rendus, xci., p. 67), carried out upon the milky juice collected from a fig tree in April last, seems to show that this juice contains a powerful ferment capable of digesting albuminoid matters. As much as 90 grammes of fibrin, added in eight successive portions, at intervals of one or two days, to 5 grammes of the milky juice, and kept at a temperature of 50° C., was for the greater part digested, leaving a small amount of a white homogeneous residue, and the solution having the odor of good broth.

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THE MAGNET IN MEDICINE.

It would make a curious chapter in the history of medicine to trace the repeated fluctuations of popular and professional confidence in the therapeutic virtues of light, heat, electricity, and other "modes of motion."

Now one, now another of these manifestations of physical energy becomes the popular cure-all, and the medical journals accumulate a vast amount of testimony offered in evidence of the beneficent power of the new curative agent. Blue light and red light, heat and cold, frictional electricity, galvanism, electro-magnetism, actinism, and the rest, have all had their day, more or less prolonged, in which men were sure that the long-looked-for panacea had been found. Then would come more critical observation, wider experience, frequent disappointment, and loss of confidence. Other explanations would be offered for some of the reported cures, the verity of others would be flatly disputed, and the much-talked-of agent would fall again into more or less disrepute. Too often in such cases its use is left to quacks, who thrive more or less upon the residue of popular confidence in the power which the regular profession has practically discarded, and exaggerate the importance of the actual facts and phenomena which formed the basis of the original craze. By and by some more than usually courageous or reputable physician takes up the investigation anew, suggests a modified view of the old belief, having verified, as he thinks, the underlying truth of it, or discovered a new phase of truth in connection with the matter, and thus sets agoing another wave of professional interest and popular favor.

With each ebb and flow of opinion and interest, there is apt to remain an increment of new knowledge, or a permanent contribution to the means or methods of medicine, which makes and marks a positive advance. An instance of this may be found in the recent substantial aid which electro-magnetism has brought to the service of curative medicine.

The latest candidate for a revival of interest is magnetism, pure and simple. Ever since the mysterious power of the loadstone was discovered, there has been probably a real though varying confidence among men in regard to its power to influence physiological processes. At any rate the use of the loadstone to cure diseases was recorded as early as 550 A.D. The researches of Baron Reichenbach, sixty years or so ago, were attended by a remarkable development of interest in the influence of this form of force. Later, Dr. Keil, in England, was a prominent advocate of the theory that the human organization is extremely susceptible to magnetic influence. Among those who submitted themselves to his tests was Professor Faraday, who failed, however, to detect any appreciable effect upon his organization from the powerful magnets brought to bear upon him.

The investigations of Dr. Alfred Smee, a man highly competent for the work, materially aided in breaking down the belief in the power of magnets to produce physiological changes. In the course of his experiments with live animals, Dr. Smee placed the web of a frog's foot and the tails of fish in the field of a microscope, and subjected them to the influence of powerful magnets; but the circulation of the blood and the condition of the capillaries gave no indication of any physiological effects from the presence of the magnets. He also tested the alleged influence of magnets upon the nervous system and the organs of sense, but eye, ear, nose, tongue, and skin were equally insensible to their power. To this negative evidence there was much positive evidence tending to show that the therapeutic effects said to have been caused by magnets could be effected as well by pieces of wood, bone, brass, or other substance, painted so as to look like magnets. Accordingly the use of magnets in medicine and in physiological investigations fell into neglect if not into contempt, the prevailing opinion among intelligent men being that magnets were without power to influence physiological processes.

A turn in the tide of professional interest in this matter—due, perhaps, to the prominence which electro-magnetism has attained in medicine during recent years—is indicated by the article on "The Therapeutical Use of the Magnet," by late U. S. Surgeon-General Dr. William A. Hammond, given in the issue of the SCIENTIFIC AMERICAN SUPPLEMENT, No. 258. Dr. Hammond has been trying the effect of magnets in his practice for a couple of years or so, and is convinced that the magnet is really capable of exercising a strong physiological influence, and that there are substantial reasons for believing that it may be used to advantage in medicine. He has tried it in cases of neuralgia, chorea, and paralysis, sometimes with strong evidence of beneficial effects. Our medical readers will be particularly interested in the cases which he reports. If it should turn out that pain and disability in any form can be removed or even mitigated by the simple process of binding magnets upon the affected parts, it is obvious that the remedy should not be despised.

Apparently the time has come for a reinvestigation of the whole matter.

THE ANTHRACITE TRIAL AT THE BROOKLYN NAVY YARD.

Great interest has been felt for some time past among engineers to learn the result of the recent trial, by the United States Board of Examiners, of the high pressure boilers of the little English steamer the Anthracite, a detailed description of which, with illustrations, appeared in the SCIENTIFIC AMERICAN of Aug. 7. Its owners had put forward the great economy of fuel possible as the principal ad-