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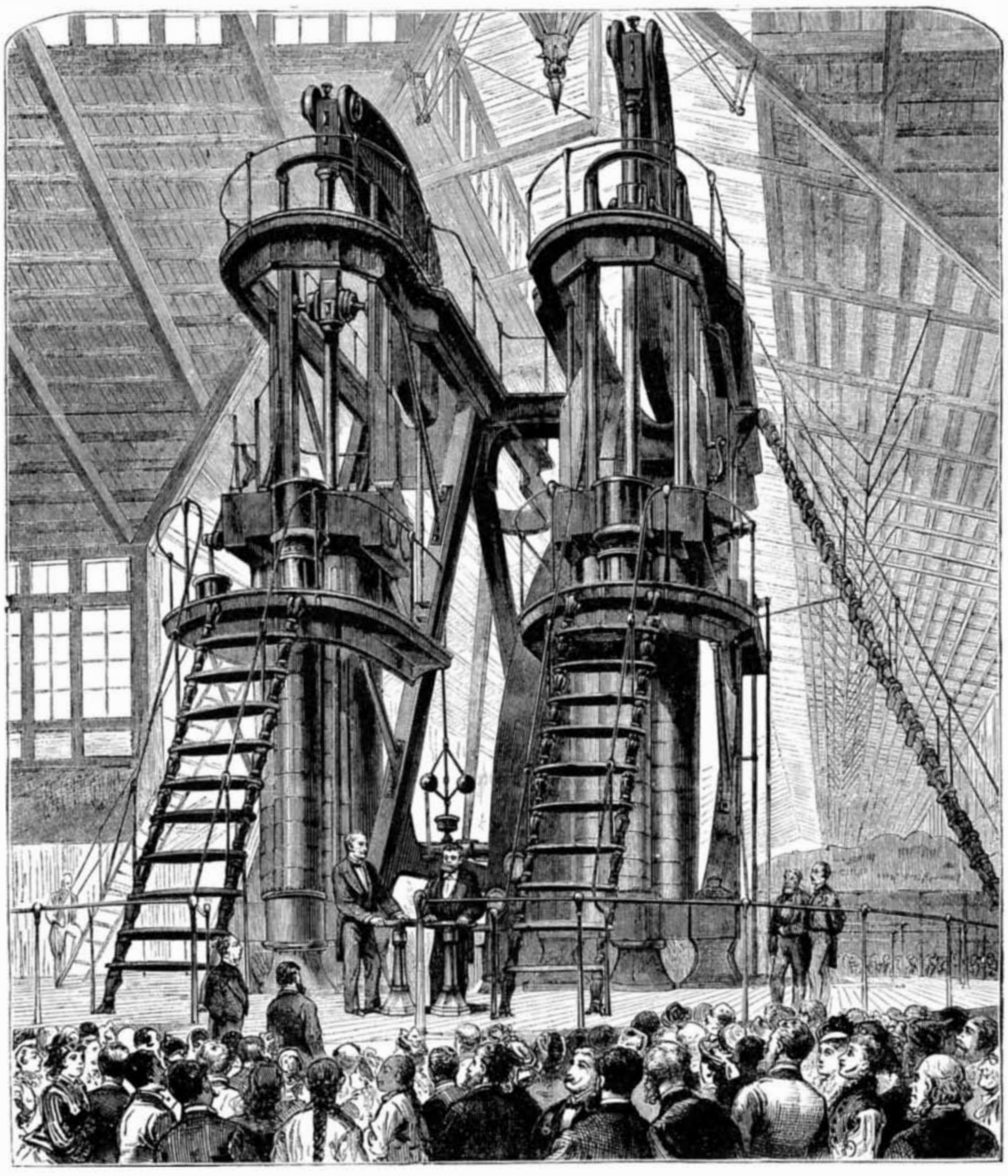
THE CENTENNIAL EXHIBITION--THE GREAT CORLISS ENGINES.

In the annexed engraving are represented the great Corliss engines, which furnish a part of the power to the mechanism displayed in Machinery Hall. It is expected that other engines exhibited will also be geared to shafting and thus put to useful work. There are not many points of actual novelty about the Corliss machines, and they may fairly be classed as gigantic specimens of a well known engine, with smaller sizes of which our machinists have long been familiar. They are very lofty, perhaps too high for critical engineering taste, and at first sight remind one of the ordinary river boat beam engine, with however a solid instead of the skeleton beam. The frame is A-shaped, the beam center being at the vertex with the cylinders and main shaft located at the base angles. The various parts of the frame are in the hollow or box form, and the corners are flattened, giving an almost octagonal section. A very curious effect is gained by abolishing straight lines in the working parts and substituting curves and S pieces, an innovation the value of which engineers are somewhat disposed to question. The cylinders are 40 inches in diameter, 10 feet stroke, and are rated at 1,400 horse power. The single shaft to which they are connected carries a magnificent gear wheel, of 30 feet in diameter, 24 inches face, and having 216 teeth cut with a pitch of 5·183 inches. This is probably the largest cut iron gear ever made. It weighs 86 tuns, and its periphery travels at the rate of over 42 miles per hour. The crank shaft carrying this wheel is 19 inches in diameter, and is made of the best hammered iron. The bearings are 18 inches in diameter and 27 inches long. The cranks, of gun metal (iron), are polished all over except in the recesses on the back, and weigh over 5 tuns each. The beams are 9 feet wide in the center, 27 feet long and weigh each about 11 tuns; they are also of quite novel form. The connecting rods, now that they are in place, have the appearance of being rather light; but this comes no doubt from the massive look of the beams, which have a more ponderous appearance than is their due, on account of their unusual depth at the center. In order to have these connecting rods of as perfect material as possible, they were built up entirely of worn-out horseshoes, of which there were used in their construction no less than 10,000. They are 25 feet long. The piston rods are steel, and are 6¾ inches in diameter.

The finest part of the whole machine is unfortunately out of sight, since it lies in covered ways under the floor. We allude to the gearing by which motion i; imparted to the shaft. The immense gear wheel drives a pinion of 10 feet in diameter, and parallel to the axis of this is a line of shafting, diminishing from 9 to 8·7 and 6 inches. This, by means of four trios of miter bevels, transmits power to four 6 inch shafts at right angles, leading in different directions to walled pits under heavy standard frames, which carry the driven pulleys on the ends of the overhead shafting. We cannot speak too highly of the workmanship of this mechanism. It works with perfect smoothness; and so correctly are the wheels cut and the various portions fitted and arranged that no noise is apparent.

The Corliss valves and valve gear are too well known to need description here. One of the principal modifications is a substitution of an S lever for the usual disk which operates the valves. The weight of the entire machine, with its shafts, is over 700 tuns.



THE CORLISS ENGINES AT THE CENTENNIAL EXHIBITION.

Improvement in Freezing Mixtures.

M. Dubrene, says the *Moniteur Industriel Belge*, has devised a means of producing refrigerating mixtures which will give varying degrees of cold, as may be desired. The invention is based on the fact that, when nitrate of potash or, better, nitrate of soda is added to nitrate of ammonia (the added salts not exceeding a certain proportion), the resulting mixture produces, by its solution in water, a lowering of temperature very nearly equal to that produced by nitrate of ammonia alone. It is thus that, in making mixtures in which the nitrate of soda enters in the proportion of 1 to 40 parts and the nitrate of ammonia in the proportion of from 99 to 60 parts in 100, compounds are formed by which temperature may be reduced by Fahrenheit degrees varying in number between 70 and 482. A mixture of 20 parts nitrate of potash and 80 parts nitrate of ammonia reduces temperature 87° Fah

Effect of the Centennial on Business.

The *Evening Post* thinks that one result of the Centennial will be a relaxation of the business stringency which has existed in New York and other Eastern cities. If only 5,000,000 people, exclusive of the inhabitants of Philadelphia, should visit the Exposition, and spend but $25 each, $125,000,000 would thus be put into circulation. As a rule, says the *Post*, it may be assumed that the great body of those outside of Philadelphia who go to the Exhibition will be of the class which is thrifty and saving; the money they spend would, to a great extent, except for the Exhibition, be retained by them. Excluding that part of this money which will be received by those who furnish the necessaries of life to the visitors, this money will first go into the hands of retail dealers; for without doubt, many who visit the Exhibition from distant points in the country will take the opportunity of doing more or less shopping in New York and Philadelphia. Of course, to the extent that this shopping is done here and in Philadelphia rather than at home, will the retailers in the sections from which the visitors come suffer. It is probable, however, that more will be spent away from home than would have been if the buyers had remained at home. The immediate beneficial effects on the trade will, therefore, fall on the retailers. It is fair to assume that, in any event, the local interests of New York and Philadelphia will be largely benefited by the Exhibition, and those of New York nearly, if not fully, as much as those of Philadelphia.

Specific Gravity.

When the king asked Archimedes if he could find out whether the jewelers had, in making the crown, kept back some of the gold, and supplied its weight with some other metal, the philosopher was put to thinking and experimenting; and one day he exclaimed, with excited energy: "*Eureka! Eureka!*" ("I have found it! I have found it!")

What had he found? He had discovered that any solid body, put into a vessel of water, displaces its own bulk of water; and therefore, if the sides of the vessel are high enough to prevent it running over, the water will rise to a certain hight. He now got one ball of gold and another of silver, each weighing exactly the same as the crown. Of course the balls were not the same size, because silver is lighter than gold, and so it takes more of it to make the same weight. He first put the gold into a basin of water, and marked on the side of the vessel the hight to which the water rose. Next, taking out the gold, he put in the silver ball, which, though it weighed the same, yet, being larger, made the water rise higher; and this hight he also marked. Lastly, he took out the silver ball and put in the crown. Now, if the crown had been pure gold, the water would have risen only up to the mark of the gold ball; but it rose higher, and stood between the gold and silver mark, showing that silver had been mixed with it, making it more bulky. This was the first attempt to measure the specific gravity of different substances.—*Miss Buckley.*

Progress of the Burglar's Art.

We learn from an English contemporary that, notwithstanding the many precautions taken by eminent safe makers to prevent the possibility of any forcible opening of their indispensable manufactures, the skillful and scientific burglar has lately adopted the method of destroying the works of safe locks by powerful acids, the introduction of which, it is asserted, renders both the copper and iron of the works soft and pliant in a few moments.

NEW SAFETY BANK CHECK.—One of the banks at Lyons, France, uses checks of paper dyed to a full shade of ultramarine green, upon which the name of the bank is lithographed The amount and signature are written in with a dilute mineral preparation, producing yellowish white letters and figures on a green ground. In this country it is not uncommon to write with a solution of oxalic acid on a blue paper, which produces a similar result in a more simple way