HOISTING ENGINES FOR THE ANACONDA MINE.

The accompanying illustration depicts a front view of one of a pair of hoisting engines recently built by the Union Iron Works, of San Francisco, and now being erected on the "Never Sweat" shaft of the Anaconda Mine, of Butte, Montana. Its mate is also being erected at the same time on the Montain Con. shaft belonging to the same company.

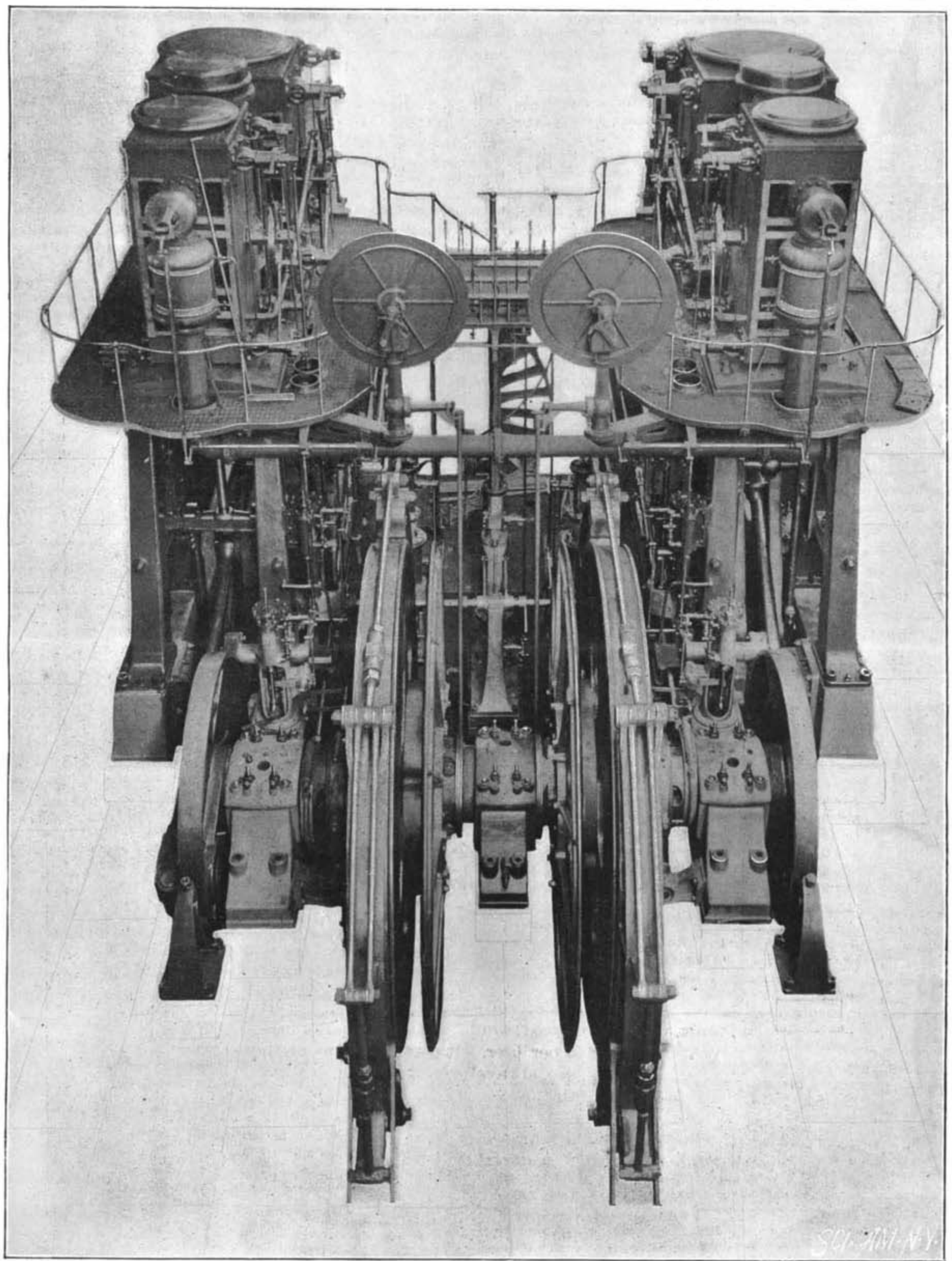
The work of these engines will consist in raising four deck cages, each loaded with one ton of ore, at the rate of about 3,000 feet per minute. The total load, including rope, cages, cars and ore, is about 26,000 pounds.

These mammoth pieces of machinery are named the "Modoc" and "Aztec," and are the largest of their kind ever built on the Pacific coast. Each consists of one left hand and one right hand compound beam engine, connected with the reel shaft by disk cranks, the crank pins being set at right angles. The cylinders are vertical and inverted. There is one high pressure 26 inches in diameter and one low pressure 46 inches in diameter for each engine, making four cylinders for each machine. The pistons are connected with the opposite end of the beams by piston rods, crosshead and reach rods or links. At the top, or king post, of each beam one of the main connecting rods takes hold, while the opposite end of the rod is attached to the crank pin, which at all times will give a positive stroke of 72 inches to the pistons.

The high pressure cylinder is located in front of the low pressure cylinder, with a reheater between them. Both are steam jacketed. The condenser water will be automatically carried off from the jackets by steam traps discharging into feed tanks or condensers. The cutoff valve gear mechanism on the low pressure cylinders is adjustable by a hand lever or governor, as desired, while the cutoff valve gear mechanism of the high pressure cylinder is controlled by a governor and by a hand lever on a working platform. The cylinders of each engine are supported by a cast iron frame, consisting of four vertical and four diagonal columns resting on a heavy bed plate and securely bolted to it. They are handsomely covered with teak wood lagging, with highly finished metal covers at the top end.

The main valves of each engine are of the Corliss type, and are worked by a wrist plate, which derives its motion from an eccentric on the reel shaft and a crank on the beam pin. The motion is a modification of the Walseheart valve gear. The reversing gear is operated by a separate engine and a hydraulic controlling cylinder. The beam center bearings are cast in and form part of the main sole plates. The same is also true of the main bearings for the crank shaft. All are substantially fitted, and provision is made for adjustment in case of the wearing away of the moving parts. On each crank shaft there will be two reels, each of the capacity of about a mile of flat wire rope. They will be operated independently, or in balance, as may be desired. Each reel will be provided with a patent friction band clutch applied by an entirely separate engine, and hydraulic controlling cylinders. The reel brakes are of the Post pattern, with beams of heavy cast iron securely braced with steel rods, bound together at the top and bottom, each operated by a special engine and also controlled by hydraulic cylinders. The auxiliary engines for working the reel brakes, reel clutches, reversing gear and disk brakes are operated by hand levers, all conveniently grouped on the operator's platform, which is located between the engines and forms part of the main engine gallery. Each reel is provided with an ingenious arrangement for indicating the position of the cages in the shafts and the speed at which they are moving. To the end of the rope on each reel will be secured a four deck cage, which, when loaded and in full motion, will travel at a velocity of forty feet a second, or nearly half a mile a minute. A governor, fitted to each pair of engines, entirely controls them, giving a uniform speed to the cages, and regulating the valve gear tripping mechanism, so as to cut off at the most desirable portion of the stroke. By this means an economical distribution of the steam is secured in the cylinders and saving is made in the fuel consumed.

One main, central winding stairway leads to the upper gallery, or operator's platform, and there are numerous smaller platforms winding their way around those parts of the engine requiring constant attention or adjustment. The platforms are provided with brass-capped iron stanchions and with brass hand railings, neatly designed and highly polished. Only brass piping is used around the engines and brass drip pans are placed to catch the waste oil from the journals.



COMPOUND HOISTING ENGINES FOR THE ANACONDA MINE—HIGH PRESSURE CYLINDERS 26 INCHES DIAMETER; LOW PRESSURE CYLINDERS 46 INCHES DIAMETER; STROKE 72 INCHES.

To work one pair of these engines in all of their requirements, the operator has one foot and seven hand levers to handle, while in front of him are located the two indicators, which will require his constant attention while the machinery is in motion.

Each pair of hoisting engines has seven separate subordinate engines, and each pair weighs about 400 tons.

PROF. J. H. HART, of the Royal Botanical Gardens, reports the flowering of the bamboo this year at Trinidad, says the Popular Science News. He ascribes this rare occurrence to the thinning out of the clump last November, when a number of the stems were cut to provide fencing for the race course. In his twenty years of residence in the West Indies Prof. Hart has observed the flowering of the bamboo on two previous occasions only—in Jamaica in 1885 and in Trinidad in 1887.

Railroad Progress.

Probably few people at the present time can realize what a quaint and curious line the Liverpool and Manchester Railway was in its early days, or how totally different were all its appointments from those to which we are now accustomed, says the Railway World. Yet travelers were vastly pleased with it, and thought that to pay five or six shillings to go thirty miles in an hour and a half was the perfection of cheapness and speed. They went into ecstasies about the delight of jingling along over a jarring stone block road, in compartments about as commodious as our London four wheeled cabs or in semi-open chars-a-banc, where they became blinded with sparks and ran considerable risk of being set on fire. Every time the train stopped the passengers were bumped against each other, screw couplings being unknown till 1835; but they seem to have borne it all complacently. The first class vehicles were painted yellow, and bore such names as Queen Adelaide, Marquis of Stafford, Treasurer, and Despatch. Being usually eighteen feet long, upon a base of only six feet, they pitched up and down considerably as they ran. To the second class coaches there were light roofs or awnings, but often no sides and no doors; the color of these airy conveyances was blue or pink. About two and a half tons was the average weight of all the coaches, some more, some less, but all were constructed in the lightest and weakest manner, by builders who had by no means grasped the difference in working conditions between road and rail traction. The guard sat on the roof of the last coach, or of one fitted with a brake, and was exposed to rain and snow, heat and cold, dust and sparks, in a barbarous manner. This mode of treating a man so important to the safety of the train was usual on most lines in this country till nearly 1850, and was but one of the many ways in which the early railway men copied the stage coach system without considering how essentially different it was. The first class were "inside" passengers. The second were "outside," who must expect a taste of bad weather. The third were inconsiderable "stage wagon" people, who were contemptuously hitched on anyhow. Even as late as the seventies might be seen an inscription over the gateway of an important London terminus: "Entrance for horses, dogs, and third-class passengers."

Paper Clothing.

The Japanese have for a long time been making underclothing of their finely crisped or grained paper after the sheets have been pasted together at the edges so as to form large pieces. After the paper has been cut to a pattern, the different parts are sewed together and hemmed, and the places where the buttonholes are to be formed are strengthened with calico or linen. The stuff is very strong and at the same time very flexible. After a garment has been worn a few hours, it will interfere with the transpiration of the body no more than do garments made of fabric.

According to the Moniteur de la Papeterie Francaise, this paper weighs about ninety grains to the square foot. It has been submitted to tests that gave a breakage length of fifteen feet in the direction of the paper lines and seven feet in that of the wire marks, with an elongation of 9·7 per cent in the first case and of 7·9 in the second. The stuff is not sized, nor is it impermeable. Before exposing himself to the rain, the Japanese takes shelter under his large waterproof umbrella. However, even after it has become wet, the paper is difficult to tear. When an endeavor is made to tear it by hand, it presents almost as much resistance as the thin skin used for making gloves.