NEW ADJUSTABLE SWIVEL HANGER.

Hangers with rigid bearings having their boxes made in one piece with the hanger have been extensively used for supporting shafting, but the difficulties that occurred in fastening them to beams some distance from each other, and getting them nicely adjusted so as to be in line, have occasioned the substitution of hangers with swivel and adjustable bearings, and these are now generally preferred to all others.

Among the requirements for hangers are the following: They should be of such a form as to be rigid and free from vibration; the foot should be broad, presenting a large area to admit of being securely and readily bolted to beams by bolts of good diameter; the bearings or boxes should be lined with the best metal, and be made in proportion to the lengths and diameter of shafting; the boxes should be adjustable, as their correct adjustment is a matter of economy, utility, and great importance; in connection with the bearings there

SWIVEL HANGER—Fig. 1.

should be ample provision made for oiling and drippings; the adjusting devices should be of the simplest and still of the most reliable and efficient character. The hangers represented here fill these requirements, as may be readily seen by an examination of the engravings. The metal of the body is well distributed and put in strong form. The foot is broad, allowing for bolts of large diameter. The boxes are readily adjusted by upper and lower screws, and are capable of being moved vertically or laterally, swinging from a fixed center; they are also readily oiled, and the drip cups are easily removed for emptying and cleaning.

Fig. 1 shows the swivel hanger without and Fig. 2 with an arm for a belt shifter. The proportion of the length of the boxes is four times the diameter of the shaft, and they are lined with good metal. This hanger was patented November 13, 1877, by Messrs. First & Pryibil, the extensive manufacturers of wood working machinery, whose machine works are at the corner of West Fortieth street and Tenth avenue, in this city. They have designed this hanger more especially for the export trade, aiming at neatness, strength, and ready adjustment, and we think they have succeeded in attaining these features.

Gold and Silver in the Andes.

An interesting dispatch has been forwarded by Mr. Gibbs, our minister to Peru, to the Department of State relative to the gold and silver production in Peru, from which we condense the following: Peru had up to last year no regular code of mining laws, but the Congress of that country has recently passed a law aiming to counteract the evils of the old system, under which mines could be held indefinitely, although under merely nominal working, there being over 15,000 mines in Peru, of which, however, only about 600 are actually worked. The legal rate between silver and gold was formerly 15½ to 1, but gold was demonetized in 1872, and silver is no longer in circulation owing to the suspension of specie payments. In 1876 gold ranged at 90 per cent premium and silver at 56. There is but little silver coin in Peru at present, although much plate, comprising common bedroom utensils, is still owned by families in the interior and in the large towns. During the past ten years $36,000,000 worth of silver has passed through the Lima mint for coinage or assay, the amount coined being $17,000,000. Gold coin pays 3 per cent export duty. The exportation of national silver coin is prohibited, but silver bars may be exported on payment of 3 per cent and coin is accordingly melted into bars to evade the prohibition. There is but a slight production of gold, but silver is largely produced and exported either as metal or ores. Coinage is unlimited and gratis, the mint receiving bullion and returning its value in coin. Silver is found in all the western range of the Andes from latitude 3 degrees to 22 degrees south. The district of Cerro del Pasco produced, between 1630 and 1849, $475,000,000. A tunnel on the plan of the famous Sutro Tunnel is projected at Cerro del Pasco, 150 feet below the present workings, and is calculated to open up 100,000 square yards of surface and $500,000,000 worth of fresh ore. This is but one of the many mining districts, as others of equal value with better railroad facilities exist in the province of Puno. Before the modern system of railways the difficulties to be encountered in the way of smelting silver were incredible, the ores being transported great distances on mules' backs over rugged mountain paths, where often animals with their loads were lost through a misstep, yet, notwithstanding this, immense quantities were smelted at the government works. There is an immense but fluctuating export trade in ore and bullion from Peru to England. In 1875 coin to the value of $2,735,000 was exported, and in August, September, and October of 1876, $2,024,920.

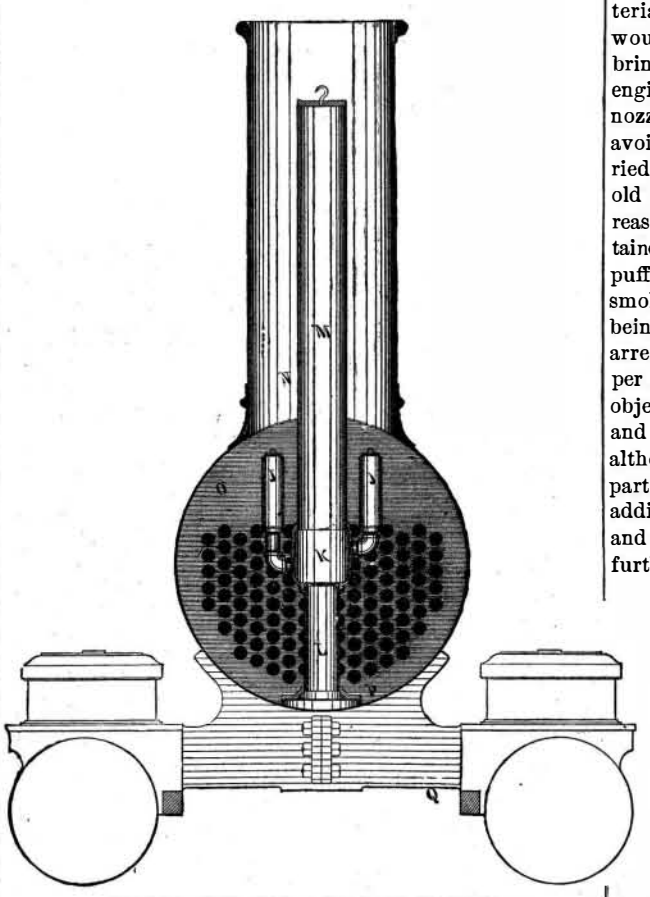
SHAW'S IMPROVED EXHAUST NOZZLE.

The annexed engraving represents an exhaust nozzle, invented by Thomas Shaw, of 915 Ridge avenue, Philadelphia, Pa., which has for some time past been successfully applied to locomotives, high pressure stationary, and marine steam engines. The engraving shows its application to a locomotive. It will be seen from this that the stack is straight and of a diameter larger than is usual. This form of nozzle is used where the maximum quieting effect is desired; the steam cushion chamber, M, extends up the stack, N, and the large exhaust pipe, L, connects with the expanding chamber, K, from which branch off eight or ten spiral exhaust nozzles, J, the number being regulated by size of engine.

The violence of the exhaust from the engine is entirely subdued, the draught is excellent and less variable. This description of exhaust nozzle can be applied to all heavy engines working in cities and towns where noise from the exhaust steam and sparks from the furnace are objectionable.

The inventor, who is a practical engineer, claims that this nozzle equalizes the draught, giving a higher average, with a lower maximum draught, and permits the use of stacks of large diameters. The importance of this can be better realized when it is considered that the average velocity of gases passing out the average stack (14 inches in diameter) is 113·7 feet per second, or 77·5 miles per hour, equaling a pressure of 30 lbs. per square foot, which force is competent to elevate and eject out of the stack a two-inch cube of granite, and the maximum force is far in excess of this amount. Whereas, in forcing the same amount of gas out of a stack double the diameter, the velocity will be reduced to 28·4 feet per second, or less than 20 miles per hour, with a force of only 1·8 lbs. per square foot. Here is an example in which, by the increase of the area of stack of only four times, a decrease of sixteen times in the force of the blast is obtained, without in any way interfering with the draught.

The advantages claimed for this improvement are stated by master mechanics and captains of steamboats and steamships to be very important. For instance, by this quiet manner of exhausting, frightening horses is prevented; locomotives can enter the center of cities and towns, without being a nuisance; the screens frequently placed on locomotive stacks are not needed, neither are the extension pipes required within the smoke arch; a powerful draught is obtained without the ejection of small coal and dust from the stack; the engines can be reversed without drawing cinders into the cylinders; no brick work is required in the smoke arch; the noise that accompanies the escape of steam from boilers and exhaust pipes in launches, tugs, ferryboats, river or ocean steamers, is prevented.



SHAW'S IMPROVED EXHAUST NOZZLE.

On an experimental run with express engine No. 49, P., W. & B. R. R., having an exhaust nozzle of this description, the economy effected by its use was satisfactorily proved. On this occasion the Shaw nozzle was run with an 18 inch straight stack, without screens or extension pipes. Cylinders of engine were 16 inches diameter by 22 inches stroke; driving wheels 66 inches diameter; maximum steam pressure, 120 lbs.; area of outlet of the Shaw exhaust, 16 square inches; diameter of old exhaust nozzle (which was a double nozzle), 3¼ inches, or a working area of 12 square inches. The coal used was ordinary bituminous. Engine 49 is known as one of the most economical engines on the road, and the engineer in charge of same has a good reputation for careful running, and is extremely economical in the burning of coal. The trial was intended to be a severe one for the new nozzle, on account of previous trials having shown a larger saving than was thought possible, and it was believed that no additional saving could be effected on that engine, her average consumption having been from 58 to 59 miles per ton of coal, but on this run, with the old nozzle, she beat her former record and made 61 8-100 miles per ton, which was accomplished by careful firing and management. The result of trial shows that the engine, with the old nozzle, consumed 3,000 lbs. more coal and ½ cord more wood in a run of 1,176 miles—notwithstanding the fact that the engine, with the new nozzle, pulled 3 additional passenger cars 96 miles and made 5 additional stops, and pulled express car 60 miles with brakes on, equal to at least 3 additional cars, (during which time she was compelled to make up 46 minutes lost at the ferry), over a moist and frosty track, at a time

SWIVEL HANGER—Fig. 2.

when the leaves were falling, causing great slipping of engine drivers and an amount of piston travel and consequent consumption of steam and fuel, so that the miles traveled over do not give sufficient record of amount of work done.

But notwithstanding these unfavorable circumstances, the engine, with the new nozzle, pulled a heavier average train 66¼ miles per net ton of coal, with a saving of 3,000 lbs. of coal and ½ cord of wood in a run of 1,176 miles. The estimated saving on the above engine amounts to $585 per annum, running only 96 miles per day. During run with new nozzle an average of 3½ barrels of fine coke was removed from the receiver, in front end, per trip, or 42 barrels during trial. This same fine coke is thrown out with the old nozzle to the injury of passengers and damage to the company. This fine coke is not estimated in the above saving. The estimated weight of this material is 200 lbs. per barrel, or 8,400 lbs. during trial. The accumulation of this material on 70 engines would be 8,929 tons per annum, and it would furnish a combustible for forge fires, and should bring not less than $2 per ton, which would net, on said 70 engines, $17,858 per annum. During the run with new nozzle all risk of drawing cinders into the cylinders is avoided, and a shallow fire of 6 or 8 inches deep is now carried, without any risk of tearing holes in the fires as in the old nozzle, which requires a depth of 15 to 18 inches. By reason of the shallow fires a more perfect combustion is obtained; very little smoke is evolved, which exhibits itself in puffs as each shovelful is thrown in. The long trail of black smoke is now converted into a cloud of steam, the smoke being decreased fully ten-fold. The new nozzle does not arrest wood sparks, but it arrests 3½ barrels of coal sparks per 96 miles run, without any screens whatever. All the objectionable noise of the ordinary exhaust was obviated and quieted down to less than one fourth of the old exhaust, although no attention was paid or adjustment made in this particular, as it formed no part of this experiment. The additional comfort afforded passengers by having less smoke and cinders cannot be estimated in dollars and cents. For further information address the patentee.

Anthropology.

Dr. E. Lambert, of Brussels, has made a careful study of the teeth in the various races of man, and has arrived at some interesting conclusions. He finds very distinct characteristics in the dentation of the white and black races, especially in the molar teeth, for while in the former race they decrease in size backward, the last or wisdom tooth being the smallest, it is the reverse with the black race, the last being the largest.

Again, in the white race the molars have usually four cusps; in the black race the more usual number is five.

He observes also in the black race a slight diastema not met with in the white, and with the former the inner tubercle of the premolar is less developed than the outer, as with the anthropoid apes.

The dentation of the yellow races is more closely allied to the white than to the black race.

The red or native American race was unexpectedly found to present very nearly the same dentary characteristics as are shown in the black race.