

[For the Scientific American.]

**THE SCERTAIN THE PROPER LENGTH OF A CONNECTING ROD.**

It is not often that the owner of a steam engine possesses any detail drawings of it; and hence when it requires renewal in its various parts, taking up the wear and lost motion, with a view to keep the parts in line and as nearly as possible of the original dimensions, is left largely to the judgment of the repairing engineer. In the case of connecting rods, however, this is at times neither practicable nor desirable, for the reason that the bearings of main shafts are apt to vary in their distance from the cylinder, by reason of the wear in the bearings or brasses, which wear tends in engines in which the crank shaft is above the cylinder, to shorten the distance between the two, the reverse being the case when the cylinder is above the crank. In horizontal engines, this is not so appreciably felt, for the reason that the wear is not so much in the direction of the length of the piston rod. When the main bearing brasses, of either vertical or horizontal engines, have been much worn, and have had the lost motion taken up at various times, they will be found, in most instances, to have varied in their distances from the steam cylinder, which may be compensated for when taking up the lost motion of the connecting rod, by making the length, from center to center of the brasses, equal to the distance from the center of the main shaft to the center of the guide bars.

In renewing the main shaft-bearings or the connecting rod, however, it is better to ensure that, the bore of the main shaft being in the center of the brasses, the length of the connecting rod is made such as to leave the clearance, between the piston head and the cylinder covers at the ends of the stroke, equal, and not to take it for granted that such is the case when we measure from the center of the guide bars or crosshead journal to the center of the main shaft. It will

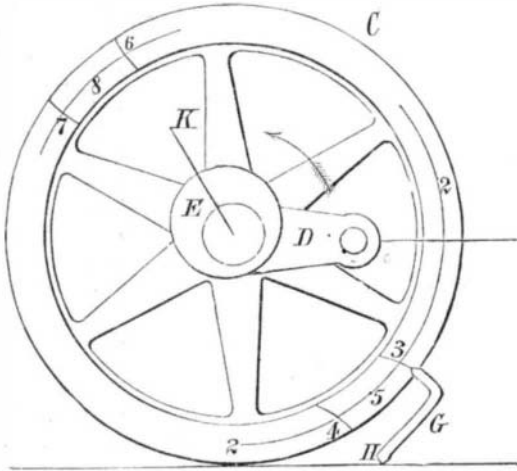


Fig. 1.

ends of the stroke, the length of the connecting rod is the distance from the center of the crosshead journal to the center of the crank pin. **JOSHUA ROSE.**  
New York city.

**No More Wooden Nutmegs.**

At a reception recently given by the Turners' Company of London to Lieutenant Cameron, R. N., as a recognition of his services in exploring the African continent, the guest of the evening, alluding to what he saw in his travels, said: "The country of Nyangwe, I firmly believe—in fact, I am sure—may be reached by the Congo; and hereafter I hope that where my steps have been we shall see a system of English trading stations for the purchase not only of ivory, for the richness of the vegetable products of the country is something beyond description. I have walked along for fifty or sixty yards under a grove of nutmeg trees, with the whole ground covered with nutmegs, and no one knew what they were worth. Besides that, there are many other vegetable products in abundance, many different species of cotton, and oil-producing palms. Up the valley of the Congo, to a height of 2,600 feet above the level of the sea, the country is crowded with oil palm; and hereafter that trade alone, leaving the question of ivory altogether on one side, will be sufficient to well repay any enterprising merchants of England who embark in it."

"What do our readers," says the *London Grocer*, "think of this? We join with them in hoping that Lieutenant Cameron's discovery will turn out to be quite true. It would be cruel for him to deceive us on so vital a point, as cheap nutmegs—such as the public understand by cheapness—have been looked for in vain ever since they were first imported; and we are convinced that in this, as in numberless other cases, it is the supply alone that creates the demand. Give us cheap, sound nutmegs, and the consumption of them will rapidly increase, and limed, worm-eaten, or wooden nutmegs of Yankee celebrity, will gradually become as rare as they are now comparatively common. It is, therefore, to be hoped that the hint thrown out by Lieutenant Cameron with reference to the enterprising merchants of England will be adopted, and that new and profitable channels of trade will be speedily opened up with that secluded corner of the globe."

**A Remarkable Surgical Operation.**

About two years ago, a waiter in a Parisian restaurant undertook to imitate the feats of the Chinese sword swallowers, by introducing a fork, handle foremost, into his throat, taking care to hold the tines in his teeth. The attempt was successful, and a repetition was demanded by the loungers in the saloon. The man complied; but while the fork was in his oesophagus, one of his comrades made an ill timed joke, the performer grinned, let go the fork with his teeth, and down it went. The pain was intense. A physician was summoned, who managed to seize the fork with a forceps; but just as he was drawing it up, the patient was seized with convulsive coughing, the doctor was compelled to relax his hold, and the fork slipped down all the way to the stomach. The symptoms of asphyxia at once disappeared, and the man suffered no inconvenience for about two weeks. At the end of that time, however, severe gastric affections manifested themselves, and the patient was sent to a hospital, where he has since, until last month, remained suffering great agony. In the month of October last, it was decided by the hospital physicians to practise the extraordinary operation of gastrotomy, that is, to cut directly into the stomach and extract the obstacle. It was at first attempted to determine adhesions of the viscera from out, inwards, by means of caustics; but this not succeeding, a triangular zone, wherein no essential organs were included, was selected as the point of perforation. In April, the incision was made, the layers of tissue being dissected away one after another. The envelope of the stomach was attained, cut, and a piece removed. The stomach itself was then opened, and pincers introduced; and after a few attempts, the fork was grasped and withdrawn. The wound was closed, and is now nearly healed, the patient suffering only from a slight stomacal fistula, already in process of obliteration. The fork was perfectly black, but otherwise unchanged.

**Turbines.**

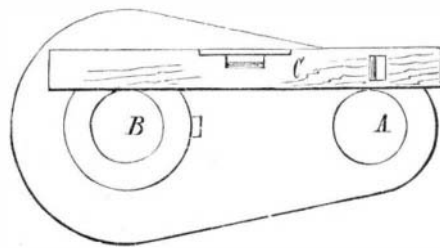
In 1854, Emile Geyelin made a wheel at Saltillo, Mexico, which was a double turbine (that is, a turbine receiving water between two movable wheels on the same shaft, which counterbalanced each other, and avoided the necessity of resisting the thrust from the head of water), for 160 feet fall, producing 125 horse power, and turning at a speed of 1,850 revolutions per hour. This double turbine, though only 11 inches in diameter, propels a cotton mill of 10,000 spindles.

**RESTORATION OF FADED WRITING.**—Moisten the paper a little with water, and brush over it a solution of sulph-hydric ammonia. Since most inks contain iron, it is easy to understand that there will be formed sulphide of iron, which is black.

face of the wheel the line, 2, which should be true with the center of the main shaft, but which can be marked from the rim of the wheel with a pair of compass callipers, provided that rim has been trued up in the lathe. We next, with a piece of iron wire or rod, bent as shown by G, make, at some fixed point, such as shown at H, a centerpunch mark; and resting one end of the scribe, G, in the fixed centerpunch mark, we scribe with the other end upon the edge of the wheel the line, 3, as shown in the illustration. Our next operation is to move the wheel forward in the direction in which it is to run, so that the crank will move to the dead center, and the guide block will leave the line, 1, as shown in Fig. 2; and the motion of the wheel being continued, the guide block will return to the mark, 1, the wheel being moved very slowly indeed, so that there will be no trouble to

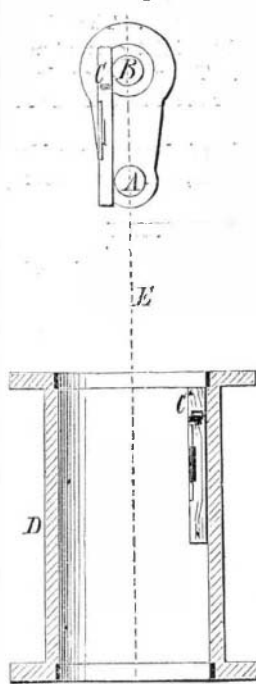
so move it that the end of the guide block will come to rest exactly fair with line, 1. We then take our wire scribe, rest one end in the fixed point, and with the other edge mark, on the edge face of the wheel, line 4, which will then occupy the place that line, 3, does in our engraving. Our next duty is to find the center between the lines 3 and 4, which we mark with a fine centerpunch mark, as shown at 5. And it will be readily be perceived that, if we move the wheel round so that the scribe, G, rests in the fixed center point, as shown in Fig. 4, at A, the other will be true with the centerpunch mark, 5, and the motion block; and hence the piston and crank will be exactly on the dead center at that end of the stroke.

Fig. 4 II



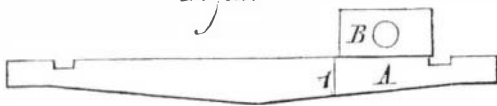
Then place the crank on its dead center, by the process here given. On the end face of the crank, and from the center of the shaft, strike a circle equal in diameter to the crank pin, as shown in Fig. 3, A representing the crank pin journal and B the circle referred to. Then take a spirit level, and place one end of it on the crank pin journal and the other end even with the circle, above referred to, as shown in Fig. 4,

Fig. 5



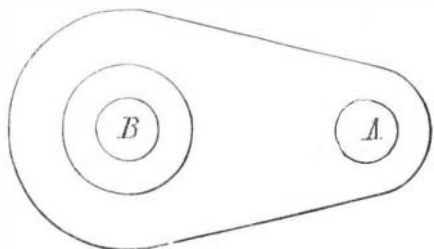
vertical cylinder, the spirit level must be applied in the cylinder as shown in Fig. 5, in which A represents the crank pin, B the circle, C in each case the spirit level, D the engine cylinder, and E the center line of the cylinder, it being obvious that it would be useless to apply the spirit level in any position, relative to the crank, in the cylinder. The crank and piston being thus placed in position at corresponding

Fig. 2.



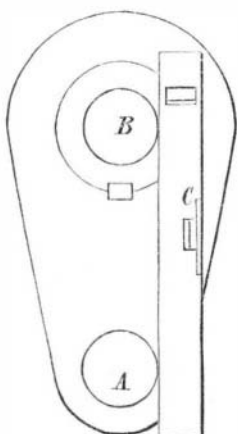
not do to measure from the center of the crosshead journal to the center of the crank pin when the latter is at midstroke, because, when the crank pin is in that position, the crosshead does not stand in the center of its travel on the guide bars, because of the angle at which the connecting rod

Fig. 3.



stands. The piston head will, in all cases when the crank stands at the center of its stroke travel, stand nearer to the cylinder head which is nearer to the crank than it does to the opposite cylinder head, the amount of the difference being dependent upon the length of the connecting rod as compared to the length of the engine stroke. If the connecting rod be shorter than the stroke, the greater is the difference referred to. From these considerations, it becomes necessary to make the connecting rod of a length to ensure that the clearance shall be equal at the ends of the piston stroke, which should be done as follows:

Fig. 4 I.



the same time overlapping the face of the guide bar, we mark on the face of the latter the line, 1, which will then be quite even with the end face of the guide block. We then (after chalking it to make the marks show plainly) mark on the