The journals of steam engines are very often made convex in their axial length, some are made concave, and still others have coned bearings to certain parts. These plans are all defective for these reasons:—the wear is unequal because the velocity of the surfaces in contact is unequal; the pressure upon the bearing is not the same throughout the surface; the lubrication is imperfect, because the oil flows from the highest to the lowest points, so that in a short time the greatest diameters are left dry unless more oil is poured on than a journal of similar size properly made should have. Any departure from a true cylindrical surface is costly to manufacture, while the use of such journals is not attended with advantages sufficiently great to counterbalance their evils except on traction engines, some parts of quick-working screw engines, or places where great strain is liable to be thrown on the parts connected—as in long connecting rods or self-propelling rods for common roads.

Quick-working screw engines, having short strokes and the crank shaft so near the cylinder-head that it makes the latter squint-eyed to look at it, wear down their gibs in the cross head (when they have any) most rapidly, and no remedy for this appears to exist but to make the gibs either of hard-wood boiled in linseed oil or else brass, disproportionately large for the area of the piston. Wooden gibs wear while the slides do not, which is a very important advantage. We have seen the gibs of a cross-head belonging to a direct-acting vertical screw engine (said gibs being of brass, about 14 inches long by 8 inches wide) worn down nearly three quarters of an inch on their face in going from this port to Savanna, Ga., in spite of all the oil that could be poured on, or attention that could be given them; it may be proper to state that the cylinder was about 50 inches in diameter and the stroke 48 inches. As an economical substitute for small brass boxes, lignum-vitæ boiled in oil or tallow is very good, and is used to some extent for many quick-running machines. These boxes last a long time and are easily replaced when worn out. A large and heavy screw engine is now building at a machine-shop in this city; the main shaft of this engine runs in cast-iron boxes well lined with Babbitt metal, but no composition of any other kind is fitted to the journal. These two metals work well together when the journals are not very large, but if we are not greatly in error this same arrangement was placed on the engine we alluded to a few lines previously, and caused so much trouble that it had to be taken out and replaced by brass boxes.

Of two evils it is far better to give too much bearing to the working parts of machines than too little, for the repairs in the first instance will bear only a proper relation to the amount of work done, while in the latter they are a continual item of expense.—*Scientific American.*

CUT NAILS.

Wilkinsons and Others.

Among the appliances which have multiplied a thousand fold the power of man in molding the substance of nature into forms adapted to the gratification of his wants, there are few that rank higher in importance than the humble little instrument which is named at the head of this article. In numbers, nails far surpass any other thing which is employed in any of the arts, and the part that they play in the construction of our dwellings, ships, furniture and other fabrics is so great that, if they were annihilated, the whole order and movement of life would be changed.

In the old plan of making nails by hand, the end of the nail rod was heated, hammered down on an anvil into the required form, pointed, cut off and headed. In the neighborhood of Manchester alone, 60,000 persons were employed in this occupation, and great numbers in all other parts of the civilized world. By the present plan of cutting the nails, one steam engine drives several machines, and each machine makes a hundred nails per minute; the workmen having nothing to do but to lay on the plates, and to put the finished nails into the kegs.

The saving of labor is also very great to those who use the nails. With the wrought nail it was necessary to bore a hole in most kinds of wood before the nail was driven; but the cut nail is so formed that it can be driven into the solid wood without danger of splitting. Probably five or ten cut nails are driven in the same time as one wrought nail. The cut nail, too, from two of its sides being parallel, and from the roughness of its edge, retains its hold more firmly in the wood.

The machinery for making cut nails is wholly of American invention, and is the result of the series of efforts by several different inventors. About the time of the close of the Revolutionary war, two brothers of the name of Wilkinson, who had iron-works in Cumberland, R. I., cut a lot of nails from some old barrel hoops—"Spanish hoops," as they were called; and these are supposed to have been the first cut nails ever made. The first patent for a nail-cutting machine was granted on the 23rd of March, 1794, to Josiah G. Person, of New York, and from that time to 1817, more than 100 patents were issued. In 1810, Albert Gallatin, Secretary of the Treasury, made an elaborate report on this subject, and he estimated that a million of dollars had been expended in bringing nail-making machinery to perfection. The machines are now models of simplicity and effectiveness, and they release a vast number of hands to be employed in the production of wealth in other forms.

The nail-cutting machine of the Wickersham Nail Company, which is really quite an interesting piece of mechanism, can now be seen in operation at the machine works of Moore, Wyman & Co., 76 Sudbury street, Boston; its simplicity and power is quite wonderful, it being capable of cutting from a twenty-inch plate of iron thirty-two two-and-a half-inch nails per second, or nine pounds of nails per minute. Of one-half-inch nails it will produce one hundred and sixty per second, cutting, heading, and pointing them at the same time, giving a point like a brad awl, which is a great advantage over the blunt-pointed nail, that so frequently splits or mangles the work upon which it is used. This machine was patented by William Wickersham, Esq., and the principles of the inventor, we understand, can be applied to the manufacture of spikes. The company proposes to purchase the entire patent