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## A CHINESE COTTON MILL.

The Governor of Hupeh has started a cotton mill of 30,000 spindles and 1,000 power looms, opposite Hankow, on the Yangste-Kiang. The mill is fitted with clectrie lamps, and a modern system of automatic sprinklers, and employs 2,000 persons, mostly children, in weaving cheap cottons. The coal comes from Japan, the cotton from Shanghai, and the yarn, which is finished with materials from Europe, finds a ready market, though loose and not durable, in the neighboring provinces. The pieces are forty yards long, and sold at \$3.75 per piece, giving the manufacturer a profit of forty per cent. The source action is budential. cent. The spun cotton is hydraulically com-pressed for home sale. The dyeing is plain, the machinery European; but only one foreigner is employed.-PhiladelphiaRecord.

## ELECTRIC AMPUTATION

A Boston paper says that a four-inch circular saw for the amputation of limbs is being installed at the Emergency Hospital in that city. An electric motor will furnish the power to run the device. The saw will be mounted on a flexible shaft like that which a dentist uses, only larger. The hearings, in which runs the saw arbor, are attached to a handle by which the surgeon is able to direct the saw at any angle. Dr. Galvin and his assistants will be able to save considerable time by the use of this appliance. Not only does the saw cut much faster than a hand tool, but the heat of its rapid cutting sears the flesh and blood vessels, and the healing processes of nature are advanced to a stage which by the old method is reached only after an hour or two.

## STREETS VERSUS STREET RAIL-WAYS.

In the recent inaugural address of the president of the English Society of Engineers there were brought out some important " points concerning the raison d'etre of street railways or tramways. If in the old days of the horse car there had been no considerable difference between the tractive effort on pavements and rails there would have been no cause for street railways. The use of vehicles riding freely over the pavement is in all respects superior to that of vehicles running on rails, with the single exception of the lower traction coefficient of the latter. Omnibuses, require no special roadbed, are not confined to fixed routes on which such a roadbed is provided, are not blocked by an accident at any one point and are greatly superior to train cars on these accounts. But the immensely greater tractive effort on but the minimum ground of the past the poorly constructed roads of the past necessitated the tramways. The speaker necessitated the tramways. The speaker referred to above classed tramways as "metallic admission by engineers and the public of the badness of ordinary roads.

Now that the horse has been superseded by the electric motor for street railway work, 1 this change necessitating the constant con-nection of the vehicle with either an over head or an underground conductor, the reduction of the traction coefficient on pavements to a value equal to that on rails would not necessarily eliminate the use of the latter, as the vehicles would be necessarily confined by the necessities of the conducting system to fixed routes. If, however, in

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future the storage battery or any other mechanical means of propulsion, whereby the car is rendered independent of the conducting system, is developed to such an extent that it can compete with the trolley, the perfection of pavements would do away with the necessity for rails.

That our roadways will be enormously improved over their present crude condition there is not the slightest doubt. The horse is a very poor dynamometer and gives but a crude indication of the work he is doing The development of motor vohicles, especially electrical vehicles, with which an ammoter shows immediately the great difference be-tween a good and bad pavement, is opening the eyes of road users to the advantages of better pavements. Belgian block pavements, especially with steel tired wheels, involve a most deplorable waste of power in the pounding, rattling and shaking of the vehicles running over them. Macadam roads are non-resilient. Asphalt pavements are better than either, except in hot weather, when their resilience often falls below that of macadam. A rigid, flat pavement would be ideal for motor vehicles, but is out of the question while horses are used. With the passing of the horse, however, the pave-ments can and will be improved and may ments can and will be improved and may reach such a state of perfection that there will be no advantage in rails. In this case if light automobile vehicles are perfected, . the street railway may become a thing of the past.-Electrical World (N.Y.)

## THE CHIMNEY AS AN AIR PUMP.

The most important duty of a chimney is the creation of a partial vacuum above the fire sufficient to draw the air needed for combustion through the interstices of the burning fuel. The action is simple, the column of heated air inside the chimney being lighter than the cold air outside, and the downward pressure from the top of the stack inside the chimney to the top of the fire being less than from the same point outside down to the under side of the grate. The heavier pressure outside tends to force air through the fire, and this air becoming heated makes the process continuous.

Although ideal in point of simplicity, in the other features of efficiency and effectiveness this process is sadly lacking. Its opera-tion obviously requires the discharge of the products of combustion into the stack at a considerably higher temperature than that of the external air, and this involves a great waste of energy. To produce a draft sufficient for hand firing with stacks of reasonable height, requires a flue temperature of approximately 500° or more. With the uneven fires and intermittent stoking of hand work, and consequent excess of air over that required for perfect combustion, this requires a loss of somewhere between 15 and 25 per cent. of the available energy in the coal.

A great part of this lost energy could be retained by the use of economizers, feedwater heaters, or finally by the use of a device by which the fresh air instead of being introduced cold under the fire, could first bo heated by the hot air escaping to the up-take In case any such refinement as this flues. were used, howover, the gases in the up-take would be too cold for proper draft-producing purposes, and mechanical draft would be necessary. The extremely small amount of power necessary for the production of mechanical draft in comparison with the large amount to be saved by proper cooling of the gases may make this a profitable refinement.—Electrical World.