

dried in the open air or in specially constructed drying rooms. By thus drying the product, the fibre, which is originally very weak, and tends to break at the slightest strain, becomes comparatively strong and does not resume its very breakable condition on the addition of water. The operations are carried out as follows:—

The damp masses on the frame are transferred to a travelling endless cloth, which leads them to a pair of rollers, which may be plain or provided with corrugations in the direction of their length, the ribs of the one roller being made to gear into the recesses of the other one, whereby they effect a simultaneous strong bending and squeezing of the masses. The cutting of the material in passing through the corrugated rollers is avoided by causing the endless cloth to pass over the lower roller and by placing a canvas covering around the upper roller. The pressed masses fall from these rollers on to a second endless cloth, which conveys them to a second pair of rollers, from which they are conveyed to a third pair, and so on, they being preferably pressed in this way six times. By continued treatment of the wood the fibres become at length so pliable and isolated from each other that they can be employed directly for coarse filaments. For obtaining a perfect isolation of the fibres, however, without material deterioration, these operations alone are not suitable, and their special purpose is to loosen the fibres in the transverse direction, so that in the following operation a thin, long fibre may be obtained. For this purpose the boiled and pressed masses are completely dried. After drying they are combed in the direction parallel with the fibres by means of devices provided with pins or teeth, in a manner similar to the operations for combing flax, cotton, etc., but with the difference that the pins or teeth of the apparatus must be made very strong. The separation of the extractable matter from the fibre produced by boiling the gums and soluble organic matter can be effected at any time. It is, however, preferably effected after the fibre has been spun into threads, etc.—*Scientific American*.

#### PROTECTION OF THE EARS UNDER CANNON FIRING.

Dr. Samuel Sexton, of this city, says:—"It is the experience of many officers that the vibrations of great intensity which are given off from some field pieces and bursting shells, charged with high explosives, are more disagreeable than the heavier sounds of great guns. The metal itself vibrates under these circumstances similarly to a tuning fork.

"A very disagreeable jar is imparted to the temporo-maxillary articulation when the individual is near a great gun being fired off. This is lessened, it is believed, by standing on the toes and leaning forward. Some simple precaution, to be employed by officers and men during artillery practice, would seem very much needed, since aural shock is not only painful and distressing, but orders cannot be well heard while the confusion lasts.

"There is probably no better protection than a firm wad of cotton wool well advanced into the external auditory canal. In suggesting this protection, it is believed that harm can seldom take place from pressure of air from within, since it is known that the violent introduction of air into the tympanum from the throat, by means of Politzer's method of inflation, seldom ruptures the drum head, though, if such a volume of air were suddenly driven into the external auditory canal, the drum head would in nearly all cases be ruptured."—*Scientific American*.

#### ELASTIC ENGINE FOUNDATIONS AND SUSPENSION OF VEHICLES.

The complete and stable isolation of structures, machines, and vehicles, with a view to deadening shocks, preventing the transmission of vibrations, and diminishing the resulting noise, is a problem which has received a large number of solutions, none of which has hitherto given full and entire satisfaction. The processes employed for the isolation of machines consist in the use of rigid foundations or elastic substances. Masonry foundations, even with the superposition of framework, and surrounded with trenches, have proved insufficient.

The interposition of rubber has given good results in some cases but unsuccessful ones in others, and the causes of which are thus set forth by Mr. G. Anthoni in a recent communication to the Society of Civil Engineers:—

"Rubber simply interposed between the floor and the tool to be isolated has been used for a long time, and gives good results, because the isolation is complete, but it can rarely be utilized thus because there is no stability, and movements may be produced that interfere with or are even dangerous for the service. Besides, in impact tools, the useful effect is diminished.

"If, in order to overcome such inconveniences, we connect the piece to be isolated by bolts, the vibrations pass through the latter, and the isolation is destroyed. Moreover, if we compress the rubber in order to give stability, there is no more elasticity, and if, on the other hand, we do not compress it, but allow it to retain all its elasticity, we do not obtain the stability in view of which the connecting bolt is used.

"Want of success may be due also to the improper use of rubber, for, in order to solve a problem of isolation, we must study the conditions that have to be fulfilled by the blocks from the standpoint of their form, surface, and thickness."

In order to leave rubber its entire elasticity, and to give the isolated system all the stability necessary, Mr. Anthoni has recourse to two methods, which at the same time secure isolation and stability: (1) An increase of the mass of the system to be isolated, and (2) an isolating and elastic attachment.

The first of these is applied to the foundations of machines, while the second is more especially designed for the suspension of vehicles of all kinds.

As an example of an elastic foundation for a collection of machines, we may cite the small central electric works established by Mr. Pulsford in the Faubourg St. Denis. The vibrations of these machines were annoying the neighbors considerably, and lawsuits were imminent, when Mr. Juppont, Mr. Pulsford's electrical engineer, conceived the idea of having recourse to Mr. Anthoni's method. The accompanying figure shows the application that has been made of it, and which is giving entire satisfaction.

A large oblong ditch was dug, the bottom of which was provided with a floor and a sheet of iron plate over which was distributed a certain number of rubber disks which formed an insulation at once electric and elastic. Upon these disks was laid a second iron plate riveted to a flooring that rendered the plate indistortable. It is upon this flooring that the foundation is built, places being left, of course, for the foundation bolts, and spaces being reserved sufficiently capacious to allow of the periodical cleaning of the ditch and for the accumulation of debris between two successive cleansings without interfering with the elastic suspension.

The foundation need not be of masonry, and in some cases