A NOVEL CUSHION TIRE.

A cushion tire has been invented by O. Ramsey, of El Campo, Tex., which is composed of a series of coiled springs and a series of plate springs, both so arranged between the tread and the rim that they can be easily removed and others substituted, without the necessity of removing the tire from the rim.

Of the accompanying illustrations, Fig. 1 is a perspective view of a wheel-rim, with parts broken away to show the construction of the tire, and Fig. 2 is a cross section of the tire and rim.

On the rim there are secured by straps, a series of plate springs curved to form divergent arms of unequal lengths. The plate springs are so arranged that the outer end of the long arm of one spring shall overlap the outer end of the short arm of the second spring in advance. Two sets of coiled springs are arranged around the rim and disposed in alternate series. One set is secured to the points where the plate springs are bent and fastened to the rim. The other set is secured to the points where the arms of the plate springs overlap.

The tire consists of a covering of rubber thickened at its middle or tread portion, as shown in Fig. 2. Beneath the tread of the tire a strip of cork is secured, which is designed to prevent the moisture, which might possibly penetrate the tread of the tire, from corroding the springs. The edges of the tire are seated in rabbets upon flat packing rings of rubber, likewise designed to prevent the entrance of moisture. To secure the tire to the rim, flat spring-metal bands through which bolts are passed, are employed. The bands are made in sections to permit the removal of any segment, should it become necessary to repair a broken spring.

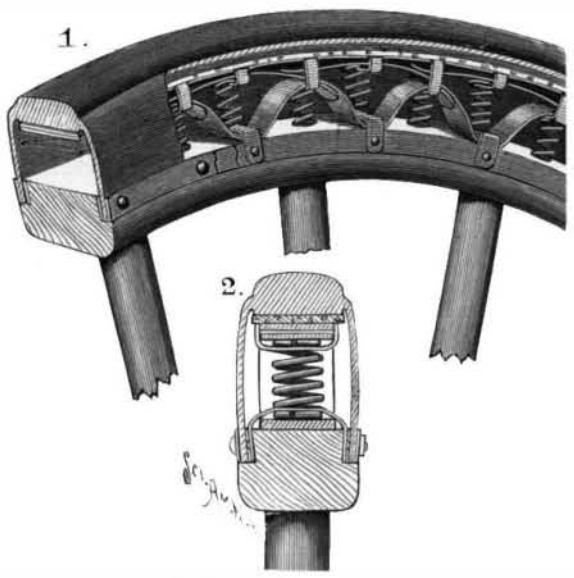
Tires thus made may be used on bicycles and other vehicles. Should one of the springs become broken, the tire will not collapse, but will still be retained in position by the remaining springs.

A LOCOMOTIVE WITH OSCILLATING CYLINDERS.

We are indebted to T. W. Garbutt & Company, of Garbutt, Ga., for illustrations of the curious, but serviceable, logging locomotive which is shown in the accompanying engraving. The peculiarity of the engine consists in the use of oscillating cylinders in place of those of the standard type. Although this is not the first time that locomotives have been constructed with oscillating cylinders, we do not know of any other instance where the problem has been worked out with satisfactory results, or where the engine has stood the test of hard service; for we are assured by our correspondent, Mr. A. G. Garbutt, that the engine in question has been doing good work, and has not developed any defects in the trunnions or the moving parts which are peculiar to this type of construction. The details are shown in the accompanying line drawings, from which it will be seen that the cylinders are carried at the ends of a hollow trunnion shaft, which is placed immediately below the smoke box, and bolted to the engine frame at this point. The shaft, which acts as a steam pipe, is divided longitudinally by a diaphragm. Steam is admitted by a two-ported reversing valve at the center of the shaft. The steam ports are formed at the forward end of the cylinder, in the hollow circular steam chest, which forms the bearing on which the cylinder oscillates.

After the cylinder has been placed on the trunnion bearing it is held in place by a circular cap on the side of the cylinder casting. This cap is clearly seen in the half-tone engraving of the locomotive. The method of securing steam-tight joints between the trunnion and cylinder casting is very ingenious. At the front of the trunnion and sliding in a recess formed in the cylinder casting is a "quarter-box," *C*, which is normally pressed in close contact with the trunnion by means of a pressure plate, *D*, and stiff spiral springs, *E*, a steam-tight joint being secured by a copper diaphragm, *G*, and rubber packing.

When the cylinder is taking steam at the front end,

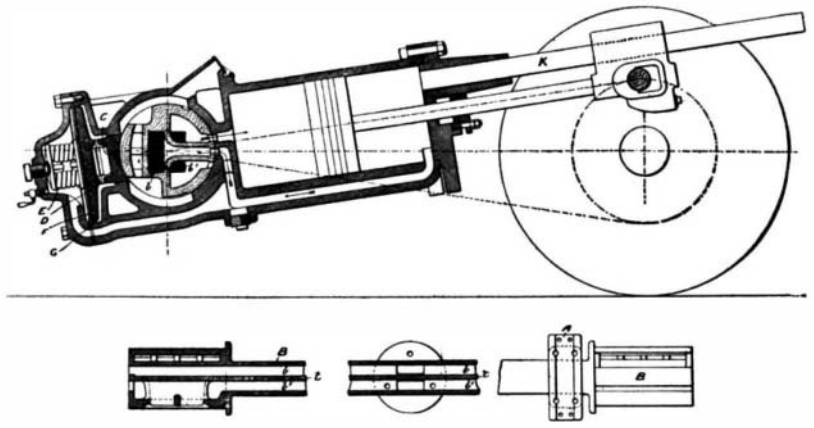


RAMSEY'S CUSHION TIRE.

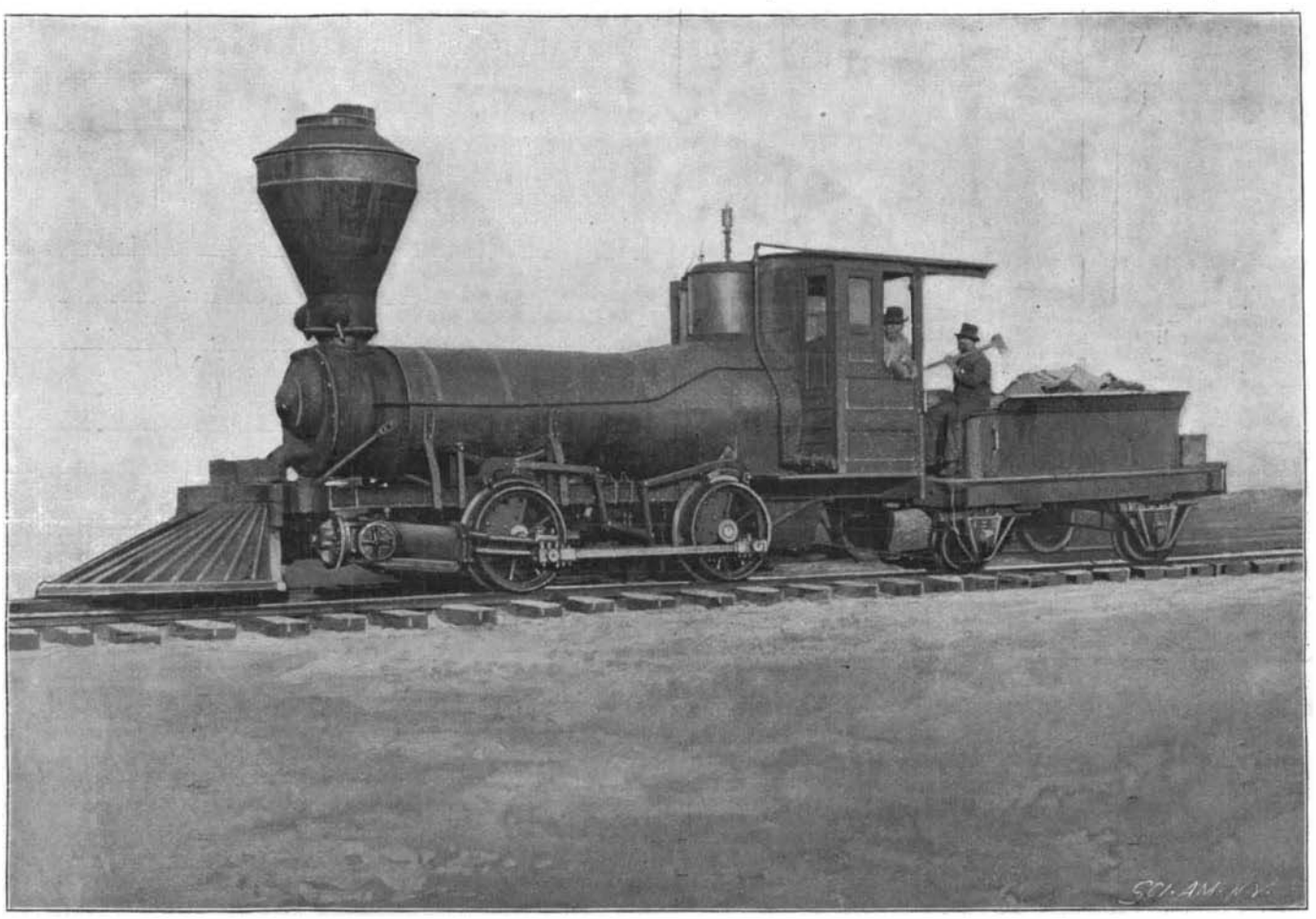
it is very evident that the pressure has a tendency to push the cylinder forward, bringing it firmly against the trunnion, thus making a steam-tight joint on the backward stroke. When the rear port is open and the cylinder is taking steam from that end, it tends to carry the cylinder to the rear; but the steam when working on this end not only fills the cylinder but also causes a pressure on the pressure plate, which bears on the "quarter-box," *C*, equal to that on the piston. This counteracts the pressure on the piston, and the coil springs already mentioned bring the cylinder forward against the trunnion and thereby make a steam-tight joint on the forward stroke. It will be noticed that the guide bar, *K*, is cast into the cylinder head and that the crosshead is connected directly to the crank pin.

The oscillating type of cylinder was adopted in this case with the object of reducing the number of moving parts and providing a very simple locomotive that could be readily handled by the men in the logging camps. The builders have certainly succeeded in simplifying the ordinary locomotive as far as the multiplicity of parts is concerned, for this little engine has neither eccentric straps, rods, nor links, and indeed the entire link motion of the locomotive is dispensed with, not to mention the main rods.

The brake has proved itself to be simple and effective. It is operated by a 6-inch steam cylinder, bolted to the bottom of the boiler midway between the frame and the driving axles. A ⅝ by 3-inch bar connects the piston of the brake cylinder with levers on both sides of the boiler, as shown in the larger engraving. Wooden brake shoes are used and springs are provided to prevent the lagging of the shoes on the wheel when the brake is not in use. The weight of the locomotive is not given, but the other particulars are as follows: The barrel of the boiler is 40 inches in diameter by 10 feet in length or 13 feet including the firebox. The cylinders are 12 inches in diameter with an 18-inch stroke. The four wheels, all of which are available for adhesion, are 36 inches in diameter, the tires being 8 inches in width. The boiler pressure is 140 pounds per square inch. Owing to the small tank capacity, the engine is limited to runs of from 12 to 15 miles in length, which, however, is sufficient for the purpose of the sawmill. On a level track this locomotive is capable of hauling twenty loaded cars with little difficulty.



DETAILS OF TRUNNIONS AND CYLINDERS.



LOGGING LOCOMOTIVE WITH OSCILLATING CYLINDERS.

Cylinders, 12 inches by 18 inches; boiler pressure, 140 pounds.

The American Sulphur Industry.

About the time of the outbreak of hostilities with Spain, in discussing the sulphur supply of this country, we ventured the prediction that if, under the stimulus of war prices, the known vast deposits of brimstone of the West and South were opened and worked, the industry thus created would not be allowed to perish with the cessation of the war, but would become permanent.

We are pleased to learn that this prediction has been verified to the letter, and a great deal sooner than we anticipated. It is now announced that the owners and workers of sulphur mines opened in California (Humboldt County) and in Utah have found that the deposits can be worked at a profit at peace prices (or those which prevailed prior to the war with Spain), and the mines are now in full blast on this basis.

The United States is thus made independent of Europe, and the rest of the world, in still another commodity, important in peace and indispensable in warfare. With her extension of territory in the tropics, the great markets there opened to her, and the mighty industrial advances thus stimulated, the time must soon come when our country will not need to go beyond her own boundary lines to obtain every necessity and even luxury of life. Whether this condition of independence of all foreign powers, or that of "give and take" hitherto existing, will be the better for us in the long run, is, however, a problem that the future must decide. — The National Druggist.

Absorption of Copper by Trees.

A solution of muriate of copper was taken up by the roots of pines near Santa Fé, says Mr. F. H. Knowlton in The Plant World. This is evidenced, according to Mr. Knowlton, by the fact that when cut, the roots of the pines which were bathed in a weak solution of the muriate yielded an oleoresin of a beautiful emerald hue.