

## COMPRESSED AIR AS A STREET CAR MOTOR.

M. Louis Mekarski, of Paris, has recently devised a novel mode of using compressed air as a motive power, which he has applied to a street car now in operation in the French capital. The mechanical portion consists in four parts: the reservoirs, the heater, the regulator, and the propelling gear.

The reservoirs, A, Fig. 1, are cylindrical receptacles, made of plate iron, 16 inches in diameter, and are perfectly airtight. The reservoirs are connected together by copper pipes, and are divided into two series; one constitutes the main or working portion, while the other, of one third the capacity, constitutes the reserve. On leaving the reservoirs, the air passes through a column of hot water, by means of which it becomes saturated with steam at a high temperature, which column is contained in the apparatus shown in Fig. 2. The air enters by a central tube through the rose, C, bubbles up through the water (which is previously injected into the heater at a temperature of 356° Fah.), and finally accumulates in the upper part of the receptacle, forming a mixture with the steam at the pressure of the reservoirs. Instead of allowing the gaseous mixture to enter the cylinders at the reservoir pressure, which is constantly varying, it is caused to pass through a special appliance called the regulator. A conical valve, *c*, Fig. 2, is guided in its travel by the rod, *t*, at whose upper end is mounted the plate, *p*. An air spring, that is to say, a certain quantity of compressed air inclosed in a space, A, and whose pressure is regulated by the movement of the piston, P, exerts upon the plate, *p*, through the medium of the movable india rubber diaphragm, *d*, an action which tends to determine the flow or discharge on lowering the valve, *c*, and to maintain also a corresponding pressure in the chamber, B, which communicates with the motor cylinder by the distributing cock, R. The valve follows automatically the variations of the discharge, closing completely the orifice as soon as the latter stops. The intermissions which result from the employment of the expansion have, therefore, no influence.

For insuring, during the filling of the heater, the closing of the valve, which does not then bear upon its seat with great pressure, while working, the spring, *s*, is employed.

Finally, to prevent the leakages which may be produced through the packing, *g*, traversed by piston, P, the said piston is only made to act directly upon the air spring by means of an interposed cushion of water which it causes to flow in the annular chamber, A. This water, which fills the central space wherein the piston moves when the latter is at the top of its stroke, is admitted by the funnel cock, *e*. The air itself is delivered into the chamber, B, by means of the three-way cock, *v*, which permits, by a very simple movement, the filling of the space, A, with air already having a certain tension. A gage is mounted on this cock. The piston, P, is actuated by the pressure screw, V, which is controlled by a wheel, and which passes through a nut, E, attached to the apparatus by three iron standards.

The hand wheel is worked by the driver. The pressure of air and steam allowed to enter the cylinders is, therefore, regulated automatically to a given point, notwithstanding the variation of pressure in the reservoirs, while, at the same time, this pressure is variable at the will of the driver. On leaving the regulator, the gaseous mixture enters the cylinders, where it acts upon pistons connected with gear more or less like that of a locomotive.

This self-propelling tram car, designed by M. Mekarski, is, as far as the mechanical portion is concerned, quite different from any other motor. On account of the use of air saturated with steam, a high degree of expansion permits of a long run being made with a small quantity of air, the expenditure of which, at a pressure of 25 atmospheres on an

ordinary tramway, was less than 11 cubic feet a mile. The working is noiseless.

The principal feature is the ease with which the car may be handled, the operations of reversing, slackening, or increasing speed, and stopping suddenly being performed with far greater ease than with a pair of horses.

At one end of the tramway must be erected some powerful expansive condensing engines, working pumps for compressing the air to a pressure of 25 to 30 atmospheres, and forcing it into the tram cars while they are standing, the excess being stored up in fixed reservoirs. Each tram car, after having completed its double journey, receives its charge of compressed air, while the heat lost during the run by the water in the heater is restored by steam led through a flex-

Fig. 1.

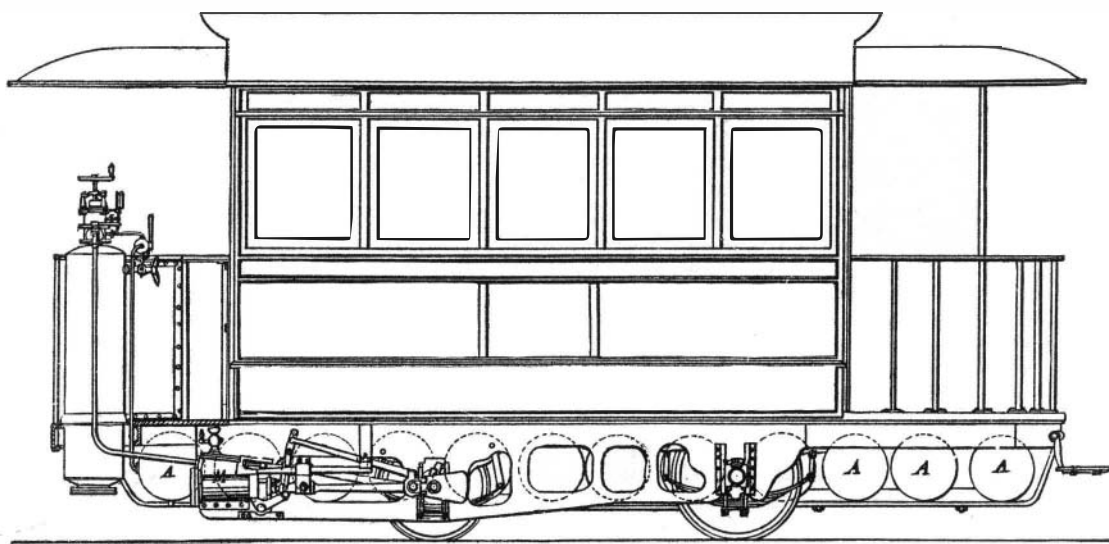
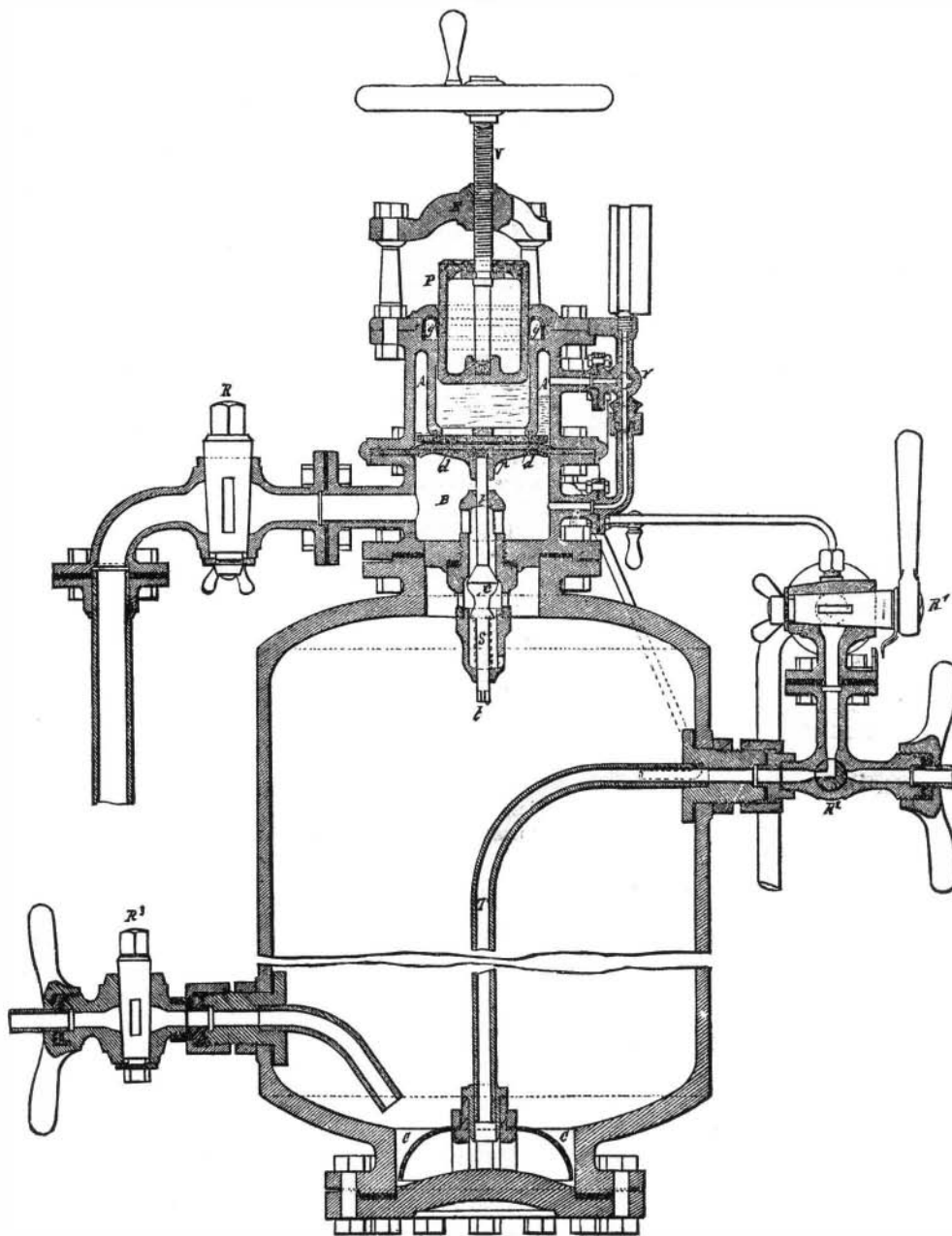


Fig. 2.



MEKARSKI'S DEVICE FOR USING COMPRESSED AIR FOR MOTIVE POWERS.

ible hose. The same system may be applied to engines for drawing ordinary cars after them.

The most important result of this invention is the possibility of storing the air in carriages at a very high pressure (twenty-five atmospheres or higher), permitting a long journey without recharging the reservoirs; nevertheless, in certain cases where it is desirable to reduce the dead weight in diminishing the number or size of the reservoirs, the charging may be effected more frequently by means of supplies of air arranged along the road at suitable distances, and attached to tubes or passages fed by the compressing works.

COCKROACHES may be driven away by putting Scotch or other high-dried snuff round their haunts.

## Causes of the Increase of Nervous Disease.

There is a general belief on the part of physicians that nervous diseases are on the increase, and a strong suspicion among many of them that insanity is growing in prevalence.

There is little doubt but that the immense and augmented use of alcohol and tobacco has much more to do with these facts—for facts we hold them to be—than the much-talked-of pressure of modern life, competition, over-brainwork, etc. Insanity from alcohol is observed where this competition is at a minimum, in Guiana, for instance. Dr. J. S. Donald, in a late article on lunacy there (in the *Journal of Mental Science*), observes:—

“With regard to the etiology of insanity in this colony, I cannot say that I find it in any way depending on, or modified by, the nature of the climate. One of the most fertile causes is intemperance. I have noticed this more particularly among Creoles and Portuguese, and in many cases I have been able to trace alcohol as the direct agent.”

“Among the lower classes rum is mostly used, and frequently in the form of high wines, rum 40 over proof. It can easily be understood that this in time seriously interferes with the bodily health, and, acting as a poison, eventually produces cerebral lesions.”

Not less certain is it that tobacco brings about the same result. Some years ago the French government directed the attention of the Academy of Medicine at Paris to this subject. A scientific statistician with an imperial commission was empowered to collect facts and data for a report, and a commission was appointed to enquire into the influence of tobacco on the human system. The report stated that a large number of the diseases of the nervous system and of the heart, noticed in the cases of those affected with paralysis or insanity, were to be regarded as the sequence of excessive indulgence in the use of tobacco. M. Jolly said that “tobacco seems primarily to act upon the organic nervous system, depressing the faculties and influencing the nutrition of the body, the circulation of the blood, and the number of red corpuscles in the blood.” Attention was also called to the bad digestion, benumbed intelligence, and clouded memory of those who used tobacco to excess.

Dr. B. W. Richardson, of London, observes that “smoking produces disturbance of the blood, of the stomach, heart, and brain, of the organs of sense, and of the nervous filaments of the sympathetic and organic nerves.” Again, he states that “tobacco smoking arrests oxygenation of the blood, and thus interferes with the full development of the structures of the body, especially in the young.”

For all this, it is ominous to note that in Great Britain, from every fresh return compiled, the use of tobacco is fast increasing, even when due allowance is made for increase of population. A recent report of the Inland Revenue Commissioners shows that, in the year 1841, 23,096,281 lbs. weight was cleared in the United Kingdom, giving 13½ oz. per head of the population; while in the year 1874 the weight cleared was 46,991,590 lbs., being at the rate of 1 lb. 7 ozs. per head.

In the United States, France, and Germany, the same is apparent.

In this connection, it is noteworthy that Dr. A. F. W. Lyle states, in the Cincinnati *Lancet and Observer*, that saffrafr counteracts the injurious effects of tobacco on the nervous system. This, he adds, was first pointed out by Dr. Thompson, of Nashville, Tenn. A few drops of oil of saffrafr, mixed with smoking tobacco, will, he asserts, render it innocuous.—*Medical and Surgical Reporter*.

**LINSEED OIL VARNISH.**—Boil linseed oil, 60 parts, with litharge, 2 parts, and white vitriol, 1 part, each finely powdered, until all water is evaporated. Then set by. Or, rub up borate of manganese, 4 parts, with some of the oil, then add linseed oil, 3,000 parts and heat to boiling.