

TRAMWAY MOTORS.

(See page 264.)

We lately described the steam-car made by the Baldwin Company, of Philadelphia, in which the boiler and engine is combined with the passenger car. This week we illustrate a separate motor by the same makers. Its general principles are similar to those of the combined engine and car. The boiler and cylinder are of equal capacity, and an iron framework, strongly braced, is used for attaching the machinery and wheels. The entire weight of the boiler, machinery and water tanks, for a line with ordinary grades, is 12,000 lb., which is no greater than the weight of a horse-car, when crowded with passengers. This is carried within the wheel-case, or the space between the two axles—thus doing away with all overhanging weight, front or back, and hence, with all rocking motion. The motor moves very steadily, and is no more liable to damage the track than is an ordinary horse-car; by the steadiness of its motion, it is probably less damaging to the rails than a horse car. If steam is used in this manner, no changes whatever are required in the cars. The separate motor takes the place of two horses, and occupies the same space in front of the car.

One of these motors was constructed in the autumn of 1876 for the Citizens' Railway Company, of Baltimore, the president of which line, Mr. John S. Hagerty, was quick to recognize the value and economy of this means of transit. The Citizens' Railway has maximum grades of 7 feet per 100, or 369 6-10ths feet per mile. The service required by Mr. Hagerty was that the motor should draw two loaded cars up this grade. The Baldwin Works constructed one machine, which was tried on the line, and was found fully capable of drawing one car, out with insufficient power for two. A second motor was accordingly built, which weighed about 16,000 lb., and which was sent to the Citizens' Railway in December, 1876, arriving there in the midst of the exceptionally severe snowstorms. During ten days' trial it fully demonstrated its capacity to do the work required. It ascended the 369-foot grade, drawing one loaded car, when the tracks were covered with mixed snow and dirt to a depth of 8 to 10 inches, in places. Where four horses were required to draw an ordinary car, the motor ascended the grade, drawing a loaded car without difficulty. As a result of this trial, the president of the company wrote on December 22nd, as follows:—"I have not tried it with two cars, but it has had a test sufficient to guarantee us in taking it, so far as climbing the hills is concerned. It has gone up the grades with one hundred passengers on the worst day I have seen on our roads." Subsequently the motor did its regular work and drew two cars without difficulty up the grade named. On several occasions during the heavy snows of December and January, the motor was used to haul the sweeper for clearing the tracks, thus taking the place of from ten to fourteen horses, which were usually employed for the purpose. The city authorities of Baltimore, however, have not as yet granted permission for the regular use of this machine on that line, and it is therefore laid aside for the present.

Another and smaller motor, weighing only 12,000 lb., was constructed about the same time, for the Urbano Railway of Havana, Cuba. On its completion it was tried for some days on the Market Street line of Philadelphia, and drew one car regularly over the road, occasionally with as many as 100 passengers. It worked with entire success, ascending the grades of $4\frac{1}{2}$ feet per 100, and was then shipped to Cuba. The results of its trial on the Urbano Railway of Havana are given in the following extract from a report in the *Commercial Bulletin* of Havana, of November 9th, 1876: "The machine which was to be tried, being attached to two cars, occupied by some forty persons, drew them with a velocity which was diminished or decreased at the command of the conductor's bell, stopping several times instantaneously without the slightest shaking being noted in the cars. The experiment was made on different occasions during the trip from the station of the 'Carmelo' to the 'Torre de San Lazaro,' and each time, at the striking of the bell, the same result was obtained. At its usual velocity, in ascending a grade of 2 per cent., it can be stopped in three seconds, and in going down the same, in seven. The consumption of fuel in this motor was found to be about the same as in the steam street car, viz., 8 lbs. of coal per mile run. Both of the motors above described were supplied with powerful steam brakes, by which the brakes could be applied instantaneously by opening a valve, admitting steam to the brake cylinder.—*Iron.*

A SWISS STEAM TRAMWAY CAR.

(See page 264.)

In the annexed engraving, from *La Nature*, is represented a steam car used on the route between Lausanne and Echellens, Switzerland. The length of the line is nearly nine miles. There are numerous curves: some having a radius as small as 62 feet. The speed at which the car travels is about 15 miles per hour, and the time of passage, including eight stoppages, 50 minutes. The steam engine and boiler is located in one end of the vehicle, similar to the Philadelphia street steam cars, and directly over the trucks. The heating surface of the boiler, according to the builder, M. Brunner, is 143 square feet, corresponding to a motive power of 25 horse. The consumption of fuel is 220 lbs. per trip. Coke is used in the towns, and soft coal during the journey. The tractile power is 1,650 lbs., and the car can be stopped by its brake within a distance of 20 feet.

The vehicle has two stories, with 24 seats in the lower one, and places for 32 people on the deck. Eight more passengers can be carried in the lower end compartment. No turn-tables are used, the car running in either direction. The total length is 41·2 feet, breadth 7·6 feet, height 13·7 feet. The weight, empty, is 11·5 tons; or, with a load of 64 persons, about 16 tons. There are many branch roads in this country where a car similar to the above might be used, and a great saving be effected in cost over the locomotive and ordinary cars now employed.

—*Scientific American.***THE MANUFACTURE OF COMPRESSED MEAT.—A NEW INDUSTRY.**

Many circumstances are conspiring to forward the interests of stock-breeders and graziers. The export of dressed beef and mutton, and of live cattle and sheep, is gradually increasing, and promises, not only to make an outlet for all our surplus stock, but to exert a favoring influence on the steadiness of prices in the home market. A new business is now growing into importance as an element of our foreign export trade, it having already reached respectable proportions in the domestic trade. This is the preparation of compressed, cooked meat, put up in cans of various sizes, from 2 to 14 pounds. This manufacture was begun three or four years ago by the Wilson Packing Co., of Chicago, who prepared fresh and salted beef, beef-tongues, and ham, in conical shaped cans of such a character that their contents could be turned out in a solid, shapely mass, perfectly presentable on the table without further preparation. This prepared meat met a popular want and an extensive demand, but, as might be expected, there was some competition from other manufacturers. Heretofore, canned meats have been put up loosely in the cans, and when turned out for consumption, presented a sodden, disagreeable mass, which was deficient in flavor. The compressed meats, on the contrary, are solidly packed, and free from liquid, and they retain all the savor and fresh taste of the best prepared food. Consequently the consumption of all other kinds than these has almost entirely ceased in this country, while foreign consumers are beginning to appreciate the better quality of these meats. This foreign demand, just now in its infancy, calls for greatly increased facilities for manufacture, and the proportions which this new business has assumed, will surprise those unfamiliar with it. For instance, two Chicago manufacturers, alone, produce 750,000 cans per month, using nearly 4,000 cattle weekly, and employing a large number of men and women. One of the factories referred to employs 700 men and 150 girls, paying \$30,000 monthly in wages, and the floors of their packing house cover four acres. The companies own their own slaughter-houses, and the meat is cut up and selected for cooking under the closest supervision. After the best has been cut up, it is cooked by steam in wooden vats, to prevent any possibility of unwholesome taint from metallic surfaces; and when thoroughly cooked, the meat is drained from liquid, pressed tightly in the cans, and sealed hermetically. It will thus remain in perfect condition for many years, retaining its flavor and succulence indefinitely. The convenience of food thus prepared, for domestic use in summer time, is very great, and it is not surprising that in foreign countries it meets with a ready sale. Recently we noticed that in one week 11,270 cases of these compressed meats, each case being equivalent to one sheep, were received at Liverpool from the United States. Each case contained twelve four-pound cans, so that this shipment weighed over 500,000 pounds, or 250 tons of meat, free from every particle of inedible or indigestible matter. In some weeks 20,000 cases are exported, so that this was below the average business. It is expected that the present war in Europe and Asia will greatly increase the foreign demand. And this is but one of the new outlets for American meat.

THE Mars mine, on Lake Superior, recently produced a nugget of copper weighing nine tons.