

Correspondence.

The "Missouri" Disaster.

To the Editor of the SCIENTIFIC AMERICAN:

In your issue of April 23, page 322, column 2, line 52, I note in the description of the "Missouri" disaster, that our navy still uses pure wool or serge cartridge bags. In my opinion this was the cause of the accident.

The English, German, Japanese, and probably other navies use raw silk for a variety of reasons, and among others that it leaves no burning residue. The fragments of it go out of their own accord in an extremely short space of time, which is not the case with serge fragments.

If the United States navy is to win in future battles, it must fire more aimed shots per minute than the enemy, and there should be no danger limit to any rate of speed that can be reached by human hands.

The ignition point of smokeless powder is too high for the heat of the gun (diminished by water cooling) to set it off. The faster you fire, the quicker you get it out of danger of the heat gradually penetrating the mass, and consequent detonation when fired, which would burst the gun.

T. W. BARBER,

Commander U. S. Navy, Retired.

14 Rue Cimara, Paris, May 6, 1904.

Narrow-Gage Railroads.

To the Editor of the SCIENTIFIC AMERICAN:

I have read with much interest your article in the last issue of your excellent paper on the "Economy of Narrow-Gage Railroads." While I agree with your ideas of the advantages of roads of the standard width, you fail to mention the saving of cost of the narrow tracks in mountainous countries sparsely settled.

About thirty years ago I was obliged to visit Colorado on some mining business, and was surprised with the facility and speed of the Denver and Rio Grande's narrow-gage road through the Rocky Mountains.

We whirled around the short curves so rapidly that it was necessary for me to hold to the seats to maintain an equilibrium; especially through the Grand Cañon of the Arkansas River, which winds around like a snake, with only one short tunnel.

No standard gage road could follow these routes, with their long curves, without a much greater expense for stone cuttings, fills, and tunnels, also lower grades than two hundred and ninety feet to the mile.

The D. & R. G. RR. then used some of the most powerful engines in the United States to pull seven little freight cars over the mountains.

Hannibal, Mo., May 21, 1904.

S. E. WORRELL.

Exposition Stamp Issue.

Postage stamps of the special issue to commemorate the Louisiana Purchase of 1803, and known as the Commemorative Series of 1904, have been placed on sale at post offices throughout the country. These stamps are issued because of the St. Louis Exposition, and the series is one that stamp collectors will want to secure. Stamps of the special issue will not be sold after December 1 next, and while on sale will not take the place of the ordinary issues, which will be sold to customers unless the commemorative stamps are especially asked for. The denominations and colors of the new stamps are as follows:

One cent, green; subject, Robert R. Livingston, United States Minister to France, who conducted the negotiations for the Louisiana Purchase.

Two cent, red; Thomas Jefferson, President of the United States at the time of the Louisiana Purchase.

Three cent, purple; James Monroe, special ambassador to France in the matter of the purchase, who, with Livingston, closed the negotiations.

Five cent, blue; William McKinley, who, as President of the United States, approved the acts of Congress officially connecting the government with the St. Louis Exposition.

Ten cent, brown; United States map, showing the territory of the Louisiana Purchase.

There is no special issue of postal cards, wrappers, or envelopes.

Silkworm Culture.

The Department of Agriculture at Washington, D. C., is investigating the possibilities of silkworm culture in the United States. It is hoped that it may in time be developed to such an extent as to prove of benefit to those members of families whose time is not altogether occupied in other ways, and also to other persons in a small way as a side issue. To persons wishing to experiment, and who can furnish proper food for the worms, the department is distributing free of charge a small quantity of silkworm eggs and also a manual of instructions. The proper food for silkworms consists of leaves from the different varieties of white mulberry tree and the Osage orange. The paper mulberry (with the fuzzy leaves) is not suitable, nor is

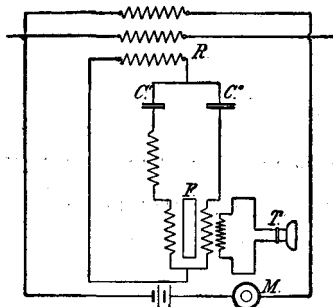
the common red mulberry. As the season is now open, applications for the eggs should be made at once, and must be accompanied by a statement as to the number and kind of mulberry trees or the amount of Osage orange which the applicant possesses; otherwise the eggs will not be sent. If the variety of the mulberry is not known to the applicant, a sample of large leaves should be sent to the department. The Department of Agriculture buys the cocoons which the worms spin, paying for them (after they have been dried) 75 cents to \$1 a pound, according to their quality. The work will prove an interesting pastime for women and children who can devote to it odd minutes during the day.

SIMULTANEOUS TELEGRAPHING AND TELEPHONING.

A new system for simultaneous telegraphing and telephoning on the same wire is at present being discussed in the Italian technical press. The system, we learn, has been tested with most satisfactory results on the Rome-Venice telegraph line, but no particulars as to the principles it is based upon had so far been forthcoming. Now, in the May issue of the *Elettriciata*, Prof. A. Banti gives a short description of the apparatus devised by Prof. Brunè and Signor Turchi. The problem the two inventors had to solve may be stated as follows: Two alternate currents of different frequencies traversing one same current, being given, to eliminate the effect of either of them.

In the present case, we have the telephone current and an induced current due to the telegraph current, both exhibiting an alternate character, but each being of different frequency, the effect of the induced current being the one to be annihilated.

In order to show how it is possible to attain this, the author considers a closed circuit, a certain section of which is divided into two branches of equal ohmic resistance, forming a differential coil wound on a weak iron core. Assuming that the two differential branches have different impedances, it will be understood that with a current of given frequency it is possible to regulate the two impedances, so as to have in



CIRCUITS OF THE SYSTEM.

the core a resultant flux equal to zero. If, therefore, two currents of frequencies α_1 and α_2 be passed through the circuit, the latter being, for instance, regulated for the frequency α_1 , only the current of frequency α_2 will give a flux different from zero. Now, if the weak iron core be the one of a telephone, the latter will show only the effects of the frequency α_2 , and, generally speaking, all those of any other frequency either superior or inferior to α_1 . A similar circuit, capable of annihilating the effects on an external circuit of either of the currents evolving through it, has been termed *separator* by the inventors.

The separation, as stated above, is obtained for currents of alternate character; in the particular case of either of them being a telegraph current, the frequency of which may range between rather extensive limits, it will be necessary, in order to obtain the separation, that the latter should have a frequency included between the above limits; otherwise the corresponding telegraphic frequencies would be, as well, eliminated.

It may finally be understood, as clearly shown by an analytical discussion of the problem, that the separator will eliminate not only the effects of a current of one single frequency, but those of a certain number of frequencies as well, all of which are very near the theoretical frequency, producing a perfect compensation. For frequencies scarcely different from this theoretical frequency the effects on the membrane will, in fact, be very small, on account of the inertia of the latter.

Ordinary telegraphic currents will produce induced currents with frequencies going as far as about 200 periods. Now, as the Brunè-Turchi separator is capable of annihilating the effects of currents having frequencies as high as 200 periods, if in any circuit induced telephonic currents with frequencies of the order above stated and telegraphic currents (the frequencies of which, as is known, are much superior to 200 periods) are present at the same time, the separator will annihilate the effects of the former, those of the latter remaining active; in other words, the telegraphic transmission will in no way disturb the telephonic transmission.

The scheme of the arrangement adopted by the inventors is sketched in Fig. 1. One of the three windings forming the coil R is inserted in series with the telegraph line, one of the other two windings being used for the insertion of the microphone M , the other forming part of the *separator* circuit. This circuit, as stated above, is divided into two branches, including capacities C' and C'' and an inductance, and terminating in two differential windings wound on an iron core F , forming at the same time the core of a third winding used for the telephone T . A. G.

Automobile Notes.

Baron de Caters, on a 90-horse-power Mercedes car, reduced, on May 15, Rigolly's kilometer record of 23.35 to 23 seconds. This is equivalent to a rate of speed of 97 1/4 miles an hour. The record was made on the Ostend-Nieuport road, and was officially timed.

The long-expected motor water carts beginning to make their appearance in Paris streets are highly successful. This new, useful municipal automobile carries 1,100 gallons. The maximum speed is 18 1/2 miles an hour. Each can be filled in six minutes and can sprinkle a mile of roadway 45 feet wide in 20 minutes. Steam is the motive power, a 35 horse-power engine being used in connection with a bevel gear drive and live rear axle. A connection between the wheels and the water jets regulates automatically the output of the latter, according to the pace of the cart, and closes them altogether when the vehicle stops.

The French and English eliminating trials for the Bennett cup race were run off recently, the French trials in the Circuit des Ardennes and the English on the Isle of Man. The trials consisted mainly of a road race similar to the actual race for the trophy, which takes place in Germany over a course in the vicinity of Homburg on June 17. As a result of the trials, a Richard-Brazier, a Mors, and a Turcat-Méry car were chosen to represent France, and a Napier and two Wolseley cars to represent England. The German team will probably consist of two Mercedes and an Opel-Darracq car, while that sent by Italy will be made up of three Fiat machines. America will not be represented this year owing to some of the machines that were to have been entered in the American trials not being ready and to no proper test being made of the cars that were prepared. The Bennett race this year will be run under the supervision of the German Emperor, and the Germans will do their best to keep the trophy in their country for another year. The fact that two of the French machines and two of the English ones selected are makes of cars which have never before been entered in this now classic race, shows that even the best of manufacturers have a hard time to always show superiority when their machines are selected by competitive trial, as they were this year.

Death of E. J. Marey.

Prof. E. J. Marey is dead. He was well known to the scientific world as an indefatigable investigator, whose work was ever marked by striking originality. His early researches were confined to arterial pulsations, and culminated in the invention of apparatus by which they could be inscribed on a moving surface, so as to give a graphic record from which their time relations might be computed. The sphygmograph was one of these inventions, which first saw light in 1863. Later Marey, in collaboration with Chauveau, took up the study of the heart. This collaboration proved scientifically fruitful. The one man was a skilled mechanic, the other a trained experimenter. The results of their work were communicated to the Parisian Academy of Sciences. Marey's graphic methods were later extended to the study of various forms of locomotion, especially the flight of birds. To him, perhaps, more than any other scientist, is due the development of chronophotographic apparatus, such as the cinematograph and biograph.

The Current Supplement.

The current SUPPLEMENT, No. 1484, opens with an elaborately illustrated article by Mr. Guy E. Mitchell, describing the government irrigation work planned south of Minidoka, near the Snake River. "Experiments Showing the Efficiency of Radiators for Gasoline Automobiles" is the title of an article of considerable technical value to chauffeurs. Dr. Lee De Forest has much that is interesting to say on wireless telegraph transmitters. "Notes on the Herons of the District of Columbia" is the subject of an interesting study of bird life by Mr. Paul Bartsch. A complete list of radio-active minerals and substances thus far discovered is published.

A composition of nine parts lead and one part silver melts at 400 deg. C. Three parts lead and one part silver melts at 500 deg. C. Six parts lead and four parts silver melts at 600 deg. C. Eight parts silver and two parts copper melts at 850 deg. C. These alloys are convenient for temperature determinations.