cumulation of the oscillations, which alone is capable of displacing the mass by a work of a certain duration, and of finally effecting the overthrow. The practical researches that we have just summarized are, we may say in conclusion, far from rendering calculation useless. They give it, on the contrary, a certain basis that it lacked in points of essential details.—La Nature.

TREATMENT OF AURIFEROUS ORES WITH BROMINE.

By C. LOSSEN.

VARIOUS procedures have been made known of late for the treatment of auriferous ores with bromine, especially as a substitute for chlorine.

Although it was found practicable to reduce the consumption of bromine to a minimum (down to 1½ lb. per ton), its application on the large scale has not become general, and the operators always returned to chlorination.

After prolonged experiments I have succeeded in developing a process for the recovery of the bromine used in the extraction of the gold, so that the working cost is considerably reduced.

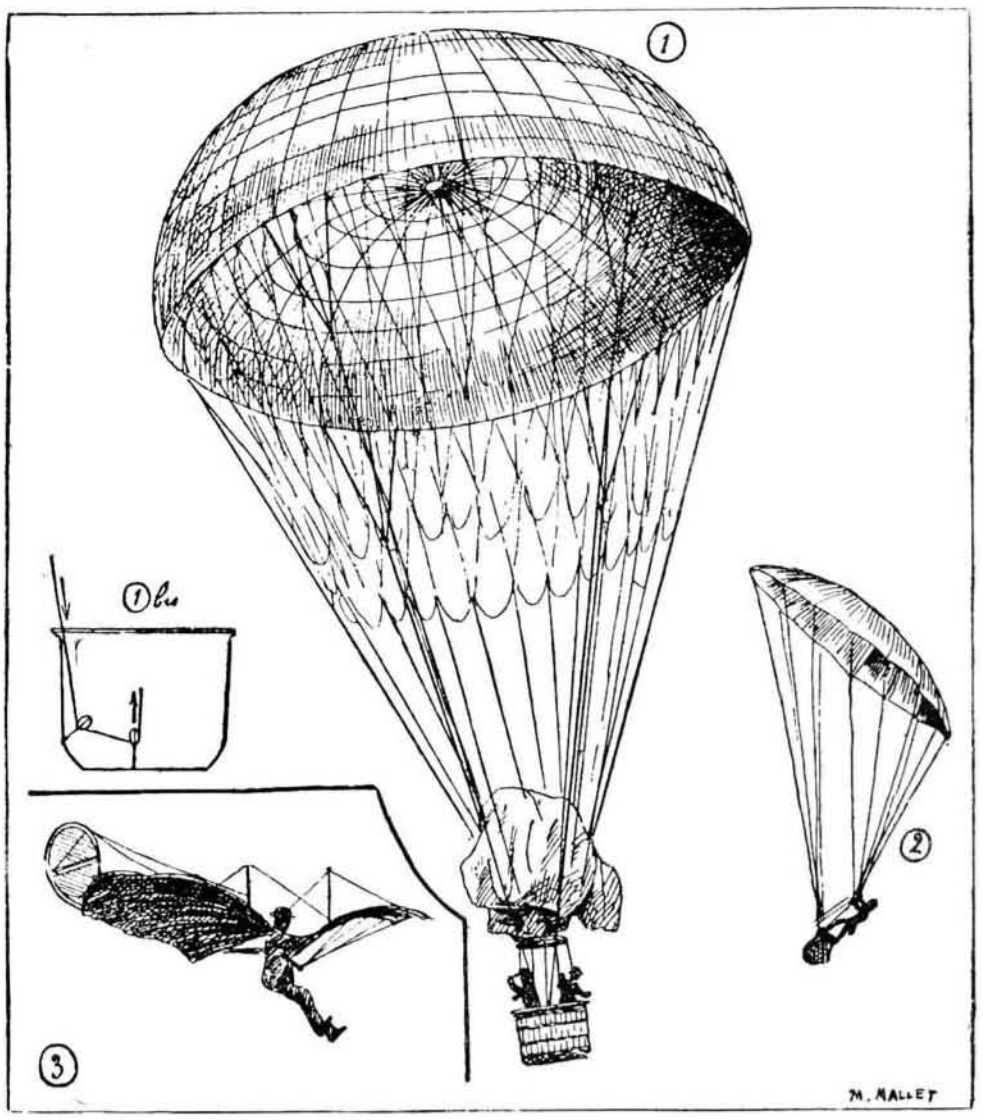
The simplest and cheapest method of liberating bromine from any compound is by means of the electric current. A solution of potassium bromide is decomposed by the current, so that, on introducing a diaphragm of asbestos cloth, a solution of bromine in potassium bromide is separated at the positive pole, while potassium hydroxide is produced at the negative pole. By the diffusion of both solutions through the diaphragm there are always formed certain quantities of hypobromites and bromates. But if such a solution is decomposed without the introduction of a diaphragm, there results an alkaline liquid, which, of course, cannot contain free bromine, but which has the property of dissolving leaf gold.

I reserve a more complete account of the method, and will here merely give the principal points of the process as about to be introduced at a mine in Oregon.

The ore, green or roasted, is mixed with an alkaline solution of bromine in a cylinder, which is maintained in rotation until all the gold is dissolved. If the mass is no longer alkaline, a second portion of the bromine solution is added before the mass is introduced into the filtering vessels. The gold is not precipitated, but remains in solution as an aurate, while iron and other metallic salts remain as hydroxides and the bromine is dissolved as potassium bromide. The filtered solution then flows, for the recovery of the gold through tanks filled with a mixture of iron and carbon, or coke, whereby the gold is entirely precipitated. The solution, free from gold and containing chiefly potassium bromide, flows into long troughs, in which it is decomposed by the electric current, and can then, as a solution of alkaline bromide, serve for the treatment of fresh quantities of ore.—Berichte Deutsch. Chem. Gesell.; Chem. News.

A GUIDABLE PARACHUTE.

ACCORDING to a Paris correspondent of the London Daily Graphic, M. Coppazza believes that the expanded parachute can be directed in its fall. For this purpose he has adopted the plan shown in the sketch. By three different smaller lines he attaches a rope to each of the two extremities of two rectangular diameters, each rope being designed to pass round two pulleys, fixed one on the side of the car and the other on the bottom. M. Coppazza considers that he may thus send his apparatus in any of these four rectangular directions by drawing the corresponding line through the sheaves of the two pulleys. This risky scheme may be considered as a sort of systematizing of a practice common among the French parachutists when nearing the land. By climbing on the edge of their car and grasping some of the ropes they are destroying in the same manner the equilibrium of their falling machine, which is sent sideways and so is prevented from being precipitated on a tree or building.



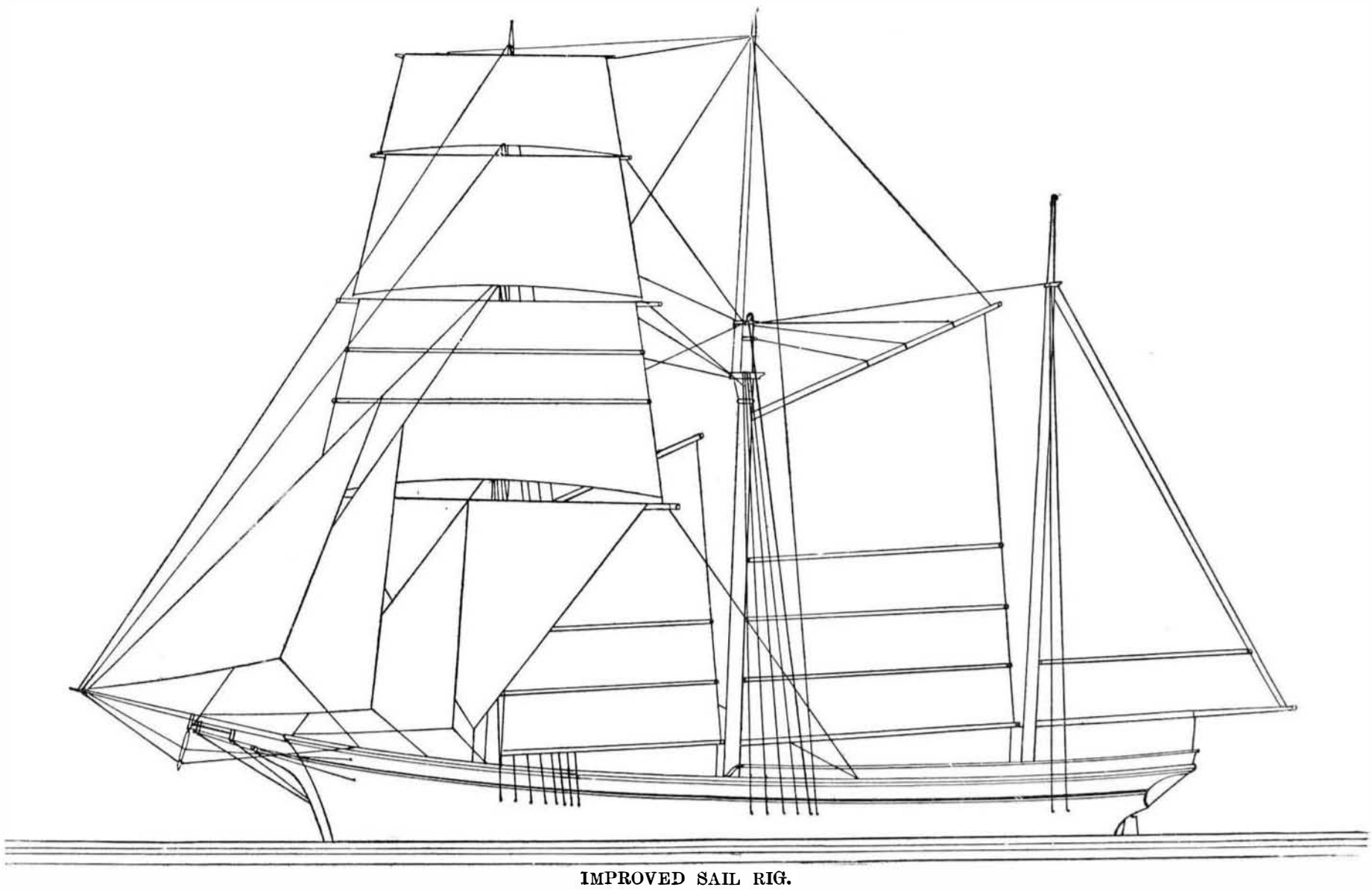
1. M. Coppazza's balloon parachute. 1 bis. One of the ropes by means of which the parachute is to be guided. 2. Common method in France of directing the fall of a parachute. 3. A new flying machine.

A GUIDABLE PARACHUTE.

AN IMPROVED SAIL RIG FOR VESSELS.

To the Editor of the Scientific American:

I send you a rough drawing of sails and rigging for a sailing vessel of from 300 to 700 tons, simply adding more masts if the size is increased. The advantage of rig and sails over that of three or four masted vessels is that it gives square sails forward with which to run in strong winds (as scudding) with the least possible risk. The great danger in sailing large fore and aft schooners running before strong winds is their liability to jibe, at which time the danger of carrying



IMPROVED SAIL RIG.