

THE USE OF FLEXIBLE BRIDLES ON KITES.

How great is the effect of wind pressure on a kite sailing in a stiff breeze every boy knows who has ever felt the strong and steady tug on a flying line. But wind pressure, besides exerting a great strain upon the line, also prevents the kite from attaining a position directly overhead. In meteorological work, it has therefore been necessary, as a general rule, to use lines of great length in order that the kites, with their freight of recording instruments, could reach the height desired. At most of the observatories, however, a device is used to lessen the strain on the lines and to permit the kite to assume a position more nearly at right angles to the horizontal, a device so simple, in fact, that any boy can make and apply it to his own kite.

In the lower part of the bridle of the kite, as indicated in Fig. 1, a strong elastic band is inserted, provided with a retarding string to prevent the expansion of the band beyond the breaking point. The effect of this rubber band is twofold. In the first place, as illustrated in Fig. 2, in which the full lines represent an ordinary kite and the dotted lines the kite under discussion, the kite starts on its upward course from a nearly vertical position. As it rises and the wind pressure increases, the kite inclines more to the horizontal and the elastic band expands (shown in the second position of Fig. 2). The stretching of the band absorbs much of the strain, which would otherwise be transmitted through the flying line, and diminishes the angle of incidence of the resisting surface to such a degree that the kite can reach the horizontal position shown in Fig. 2. The wind pressure on the resisting surface being at that point reduced to a minimum, the elastic band is relaxed and the kite assumes the fourth position represented in Fig. 2.

At the Blue Hill Observatory, kites provided with yielding bridles of the type described have been flown in gales of fifty and sixty miles an hour without breaking loose—a feat which probably could not be performed with ordinary bridles.

SOME METALLURGICAL EXHIBITS AT THE PARIS EXPOSITION.

Among the notable exhibits at the Paris Exposition are those of Messrs. Tiffany & Co., the American jewelers. Their collection is intended to be educational, showing the precious and semi-precious stones of the United States. It has been purchased, and presented to the American Museum of Natural History. In front is a large section of rhodonite, besides large quartz crystals and arrowheads, fine sections of agate, amethyst, etc. The sphere seen at the top is cut from rock crystal. At the sides are specimens of malachite, rough and cut, from the Arizona mines. An interesting piece is a section of meteorite containing peridot; cut and uncut gems of all kinds are shown, including beryl, sapphire, tourmaline, etc. A smaller case contains specimens of petrified wood from Arizona, with sections of trees; also collections of precious stones. One of our illustrations shows a fine model of a California gold stamping mill, to be seen in this section; it is about seven feet high, including base. It has been built under the direction of the California Commission by the Union Iron Works, of San Francisco. The machinery is driven by a small electric motor, illustrating the different processes by which the ore passes to the crusher, stamping mills, concentrator, etc.

Automobile License.

An interesting decision was recently rendered in a New York police court by Magistrate Olmsted. A locomobile driver was arrested on Fifth Avenue, and he admitted that he did not have an engineer's license. He was charged with violating a section of the charter which says that only licensed engineers shall use or take

charge of steam boilers carrying over 10 pounds of steam or of more than 10 horse power. At the time of the arrest the pressure in the boiler was 220 pounds. The driver proved that the boiler was capable of developing only 6½ horse power and, therefore, he stated that the vehicle did not come within the provisions of the charter. The magistrate held the same view and dismissed the charge. If this decision is upheld, it

by certain chemical substances, which have been previously introduced into it; this is known as the Malignani process. At the Exposition an installation

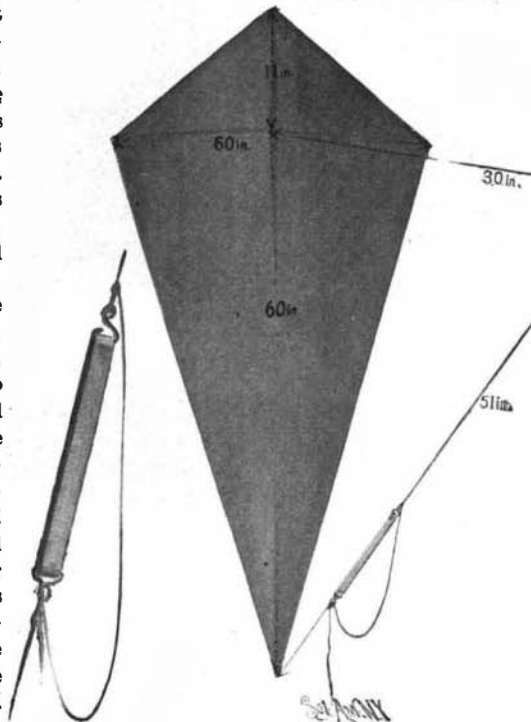


Fig. 1.—A MALAY KITE PROVIDED WITH AN EXPANSIVE BRIDLE.

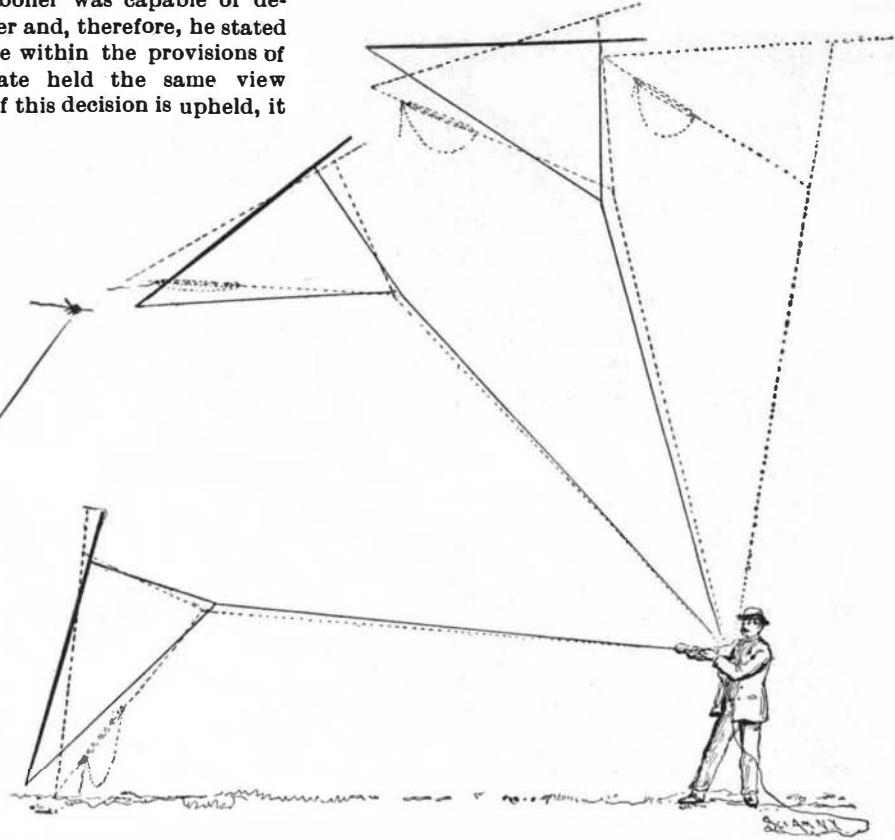


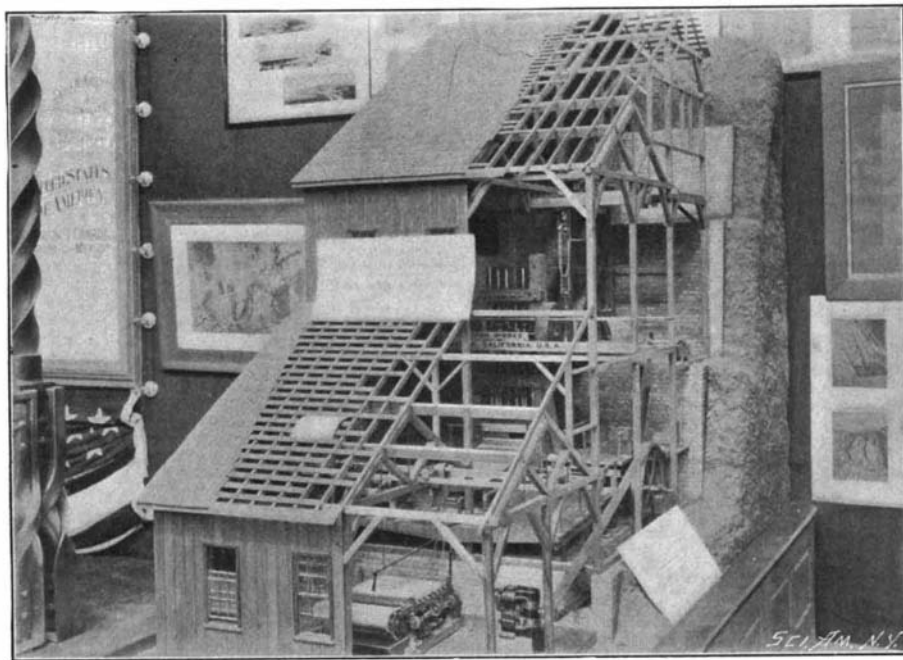
Fig. 2.—THE ASCENT OF THE NEW AND OLD KITES.

of course means that no licenses will be needed for steam carriages which have a capacity of less than 10 horse power, but the charter seems explicit in referring to both pressure and power.

A New Incandescent Lamp.

At the Paris Exposition is to be seen a new process of incandescent lamp manufacture, in which the vacuum is obtained in the bulb by the absorption of the gases

has been made for manufacturing the lamps, and the visitor may follow the operations. A partial vacuum is first obtained in the bulbs by an air pump; to absorb the remaining gases red phosphorus is the compound generally used; it is formed into a somewhat liquid paste, which is introduced by means of a piece of cotton on the end of a wire into the tube by which the bulb is exhausted, and the walls of the tube are coated with the paste. A vacuum of a millimeter is first made by the air pump. It is found that at this low pressure many of the gases will be absorbed by the compound used, especially oxygen, hydrogen, nitrogen and the hydrocarbon gases; the latter are most easily absorbed, and are in consequence used in practice. After the partial vacuum has been reached, the hydrocarbon gases are introduced into the bulb to displace the air; the pump is operated for half a minute while a current is sent into the filament which brings it to low redness. When the vacuum is made as nearly complete as possible by the air pump, a stronger current is passed in the filament, and the outside of the bulb is heated by a small gas furnace placed below it and by directing a gas flame upon the tubular part of a rubber tube to remove all moisture. When the vacuum has reached a certain point, a light blue discharge appears at the positive pole, which increases, and eventually fills nearly the whole of the bulb; at this point the lamp is separated from the pump by melting off and closing the tube. The chemical product on the walls of the tube is then heated, and it absorbs the remaining portion of the gases; at this point the discharge appears to fill the whole of the bulb, having a light blue appearance. Upon heating the lamp for a few moments the discharge disappears, and the vacuum is complete. The glass tube is then removed from the bulb by melting off in a blowpipe flame. The advantages claimed for this lamp are that the vacuum is better, the operation is more rapid, and it does away with the inconvenience of using mercury pumps.



CALIFORNIA GOLD-STAMPING MILL AT THE PARIS EXPOSITION.



THE EXHIBIT OF MESSRS TIFFANY & COMPANY, PARIS EXPOSITION.

Of the 46,988 deaths which occurred in Paris for the year 1899, says Technische Notizen, no less than 12,314, hence about one-fourth, were due to consumption; 37.2 per cent of these persons died between the ages of 1 and 20, 60.2 per cent between those of 20 and 40. Hence two-thirds of all victims of this disease were claimed by death in the prime of their life.