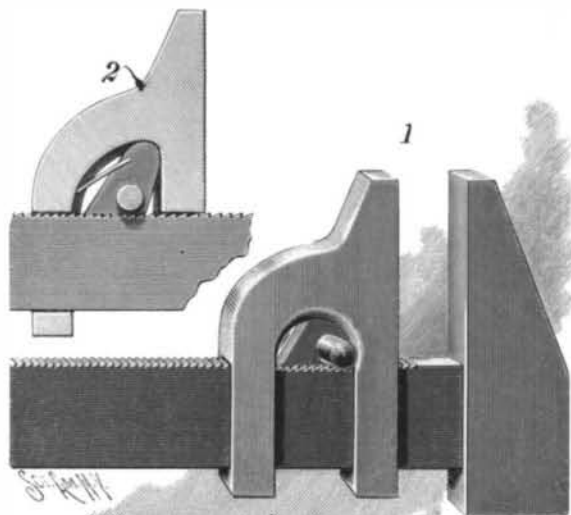


A NOVEL MONKEY WRENCH.

The illustration represents an improved wrench recently patented by Charles H. Avery, of No. 9 Linden Street, Binghamton, N. Y. Fig. 1 represents the working portion of the wrench, the handle not being shown, and Fig. 2 is a sectional view through the movable jaw. The latter, as will be seen, has a seat or re-



AVERY'S WRENCH.

cess, in which is located a clutch member, having at each side a slightly projecting ear. The teeth on the shank or stem of the wrench are inclined in the direction of the fixed jaw, and the clutch member, with the movable jaw, is held in engagement with the teeth by a spring. The arrangement permits the free movement forward of the movable jaw, to engage a nut, while by a slight pressure on the ears of the clutch member the latter may be released from such engagement and the movable jaw moved backward, as desired. When the ears are released, the spring throws the clutch member into engagement with the stem and holds the movable jaw against movement away from the stationary jaw.

Fulton's Submarine Torpedo Boat.

Nearly a century before Jules Verne wrote about the Nautilus, Robert Fulton constructed a submarine boat of that name. This fact is not generally known, and the recent memoir of M. Eugene Debosc, of the French navy, is of more than usual interest. He states that Fulton launched a submarine boat named the Nautilus at a point near Rouen on July 30, 1800.

"On the same day," he continues, "Fulton made several experiments with his boat. They lasted for three hours, and the stretch of water occupied was between Bapannul and the woodyard of Citizen Thibault, where the depth was twenty-five feet. The experiments were as satisfactory as could be desired, in spite of the fact that there was a strong current. Next day the inventor went down the Seine to Havre, where the new harbor was placed at his disposal.

"There a test was made as to the relative advantages of oars and of a screw moved by the arm, and the result was a convincing proof that by means of the screw much muscular force could be utilized. Seven minutes were required to work the Nautilus by means of oars and only four minutes by means of a screw, which Fulton styled a machine 'with wings like a windmill.'

"When a certain quantity of water was introduced the Nautilus sank readily, and in a direction parallel to herself, and she again came to the surface when the water was forced out by means of a pump. Some time afterward Fulton adopted a screw with horizontal wings, which was placed in front and which enabled him to remain under water almost constantly, even while the boat was moving. He moved to right and left by means of an ordinary rudder placed at the poop, and he also used a horizontal rudder divided into two parts. This method of steering, invented by him, is very like that which is used in modern submarine boats."

Finding that the French government would give him no aid, Fulton, who had spent a great deal of time and money in perfecting the Nautilus, crossed the channel and offered his invention to the British government.

But in London he met even with less success than in Paris. Pitt seems to have thought well of his proposition, but, powerful though he was, he failed to gain for it official approval.

HERR MARPMANN has found microbes of various kinds in seventy-seven samples of ink—red, blue and nigrosine—supplied to schools, and some of the microbes were deadly enough to kill mice inoculated with them. He recommends that ink bottles should not be left open to the air in schools.

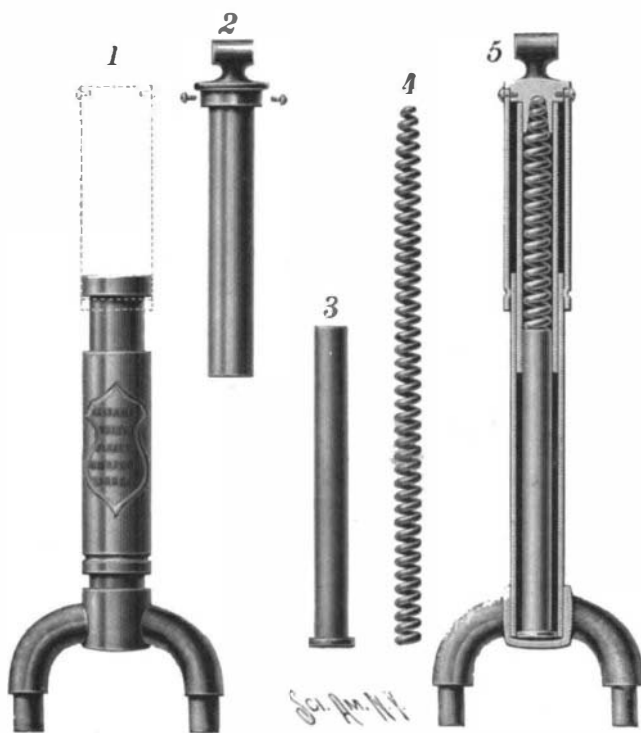
THE PIERCE PNEUMATIC CUSHION BICYCLE FRAME.

The accompanying illustrations represent improvements in a bicycle frame designed to throw upon the wheels all the vibration of a machine, relieving the rider of the most fatiguing part of the work of bicycle riding. The principal view shows the frame assembled, the other figures representing the detached parts which form the cushioning device, the steel tubing being of a high quality, especially drawn for this purpose.

The lines of the cushion frame are those of the best and latest wheels, the frame being of rigid construction, and the portion forming a part of the rear upright would not be noticed as differing from a regular pattern of frame, except for the nickeling. The improvement is being introduced by the George N. Pierce Company, of Buffalo, N. Y., under the patents of the Hygienic Wheel Company, St. Paul Building, New York City. Messrs. Pierce & Company are manufacturers of cycles and tandems, and also have branches in New York and Boston. The rear upright is, as will be seen, formed as a combination telescopic device, having but slight motion, but with a cushioning arrangement for the rear portion of the saddle formed partly of a spring and partly of compressed air in the tubes.

It is, however, wholly unlike spring seat posts or spring saddles, as the distance is always uniform between the seat and the pedals, the feet and limbs not being vibrated, and the rider being thus saved from excessive jolting on uneven roads—an improvement which cannot fail to be especially appreciated by women riders. In the illustration showing the various parts, Fig. 1 represents the lower tubular socket on the rear fork, Figs. 2 and 3 forming inner tubular portions constituting a pneumatic socket and casing for the spring, 4, while Fig. 5 is a sectional view showing the parts assembled. It is to be noted, also, that the connection between the head and the rear fork is made by means of steel plates, which give great firmness and yet afford some degree of elasticity. It is said that with this improvement the tires can be blown to any degree of hardness without causing discomfort to the rider.

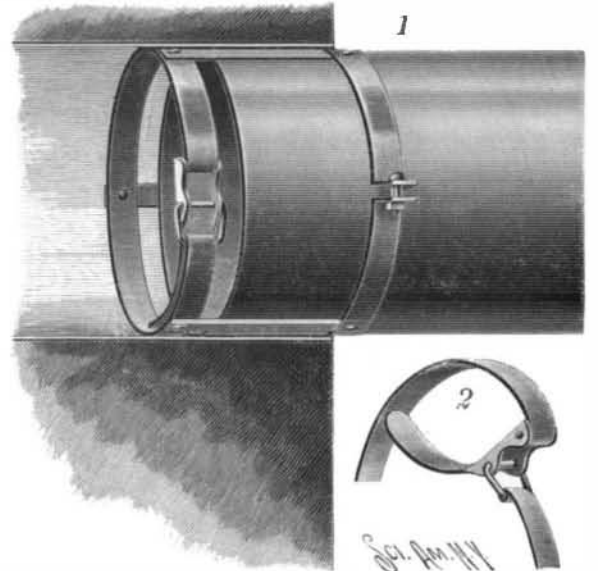
The improvement has already been in use for a sufficient time to have received high commendation from a great number of practical wheelmen. The company make the springs of four different sizes, as may be required by heavy or light riders.



THE PIERCE PNEUMATIC CUSHION BICYCLE FRAME.

A STOVEPIPE HOLDER.

A simple and inexpensive form of holder, readily applicable to one end of a length of stovepipe, and which may be contracted to be conveniently entered into a thimble in a flue or into a pipe opening, to hold the pipe in position, is represented in the accompanying illustration. The improvement has been patented by George Griswold and Harry P. Chase, of Salem, Oregon. Fig. 1 shows the application of the device, Fig. 2 indicating the movement of the inner expanding band. The two bands are pivotally connected by metal straps, each end of the outer band having an ear adapted to receive an adjusting screw by which it may be made to closely grip the pipe. The inner band has at one end a link, while at its opposite end is pivoted a curved lever, as shown in Fig. 2, whereby the band may be contracted for introduction into the stovepipe



GRISWOLD & CHASE'S STOVEPIPE HOLDER.

thimble or flue opening, the lever being afterward thrown back, as shown in Fig. 1, to expand the band and cause it to serve as a support for the inner end of the pipe.

Caoutchouc and Gutta Percha Cements.

A gutta percha cement for leather is obtained by melting together 100 parts gutta percha, 100 parts asphalt or pitch, and 15 parts oil of turpentine. It is to be used hot.

Elastic gutta percha cement, especially for fixing soles to shoes, which does not crack in bending, on account of its great extensibility, is prepared by dissolving 10 parts gutta percha in 100 parts benzine and pouring the solution into 100 parts linseed oil varnish, shaking well. The leather must be roughened before using this cement, in order to insure greater durability. By a caseine-borax cement a handsome surface gloss is imparted to the leather. The borax is dissolved in boiling water and the borax solution poured into freshly prepared caseine. The durable thick cement is very serviceable.

Good caoutchouc cements, for rubber strips or rubber goods on metal, are obtained by dissolving shellac in ten times its weight of ammonia. After standing for three to four weeks a transparent putty results, which is used without heating. The cemented places soften at first, but become hard and firm after evaporation of the ammonia, which may be assisted by heating. This cement is watertight and gasproof, and is also useful for hard rubber articles. A cement made of a mixture of gutta percha with asphalt is serviceable for the same purpose. This has to be applied hot and the pieces are to be pressed together.

Very useful cement for leather belting is manufactured by kneading 10 parts carbon bisulphide and one part of oil of turpentine with gutta percha until a thick paste results. The portions of the leather where the cement is to be applied must be unoled and roughened; the cement is put on and the ends are pressed together until the binding agent has become dry. Directions for caoutchouc cements are: 100 parts finely cut caoutchouc, 15 parts resin, 10 parts shellac, dissolved in sulphide of carbon. One part caoutchouc, 7 parts mastic, and 50 parts chloroform, left to stand several weeks.

Cement for rubber boots, etc: (1) 10 parts caoutchouc dissolved in 250 parts chloroform; (2) 10 parts caoutchouc, 4 parts resin, 40 parts oil of turpentine, mixed and dissolved. For use, pour together equal parts of both solutions.—Translated from the Färben Zeitung.

JADE is found in the Bhamo, Chindwin, and Katha districts in Upper Burma. The chief workings are in the Bhamo district, from which 254,000 pounds were obtained in 1895. Nearly all of this is sent to China, where jade stone is highly valued.

The Feather Evil.

All moralists have assured us that "when lovely woman stoops to folly," she stoops very low indeed. And so when women attempt to emulate the glories of a Choctaw chief or a South Sea islander, it is not considerations of art or humanity or self-respect that will stop them, says Natural Science. Consequently, it is not likely that the insensate votaries of fashion, who disfigure their heads with baskets of artificial flowers (irrespective of the season), virulently dyed scraps of ribbon, twists of steel, and unnaturally clipped or colored bird feathers, will pay any attention to a paragraph in a scientific journal. But we are willing to leave the irresponsible half of creation all their chiffons, their coal tar dyes and their scrap iron, if only they will leave us our birds. The rate at which some of the rarest and most beautiful birds on our planet are being destroyed to gratify this extraordinary taste can hardly be realized. On the 13th of April last nearly half a million birds were sold at an auction in London, and the details of the consignment were thus given by Mrs. Edward Phillips at the annual meeting of the Selborne Society:

Osprey plumes.....	11,352	ounces.
Vulture plumes	186	3/4 pounds.
Peacock feathers.....	215 051	bundles.
Birds of paradise.....	2,362	
Indian parrots	228,289	
Bronze pigeons, including the gourd	1,677	
Tanagers and sundry birds	38,198	
Humming birds.....	116,490	
Jays and kingfishers	48,759	
Impeyan and other pheasant and jungle fowl	4,952	
Owls and hawks.....	7,163	

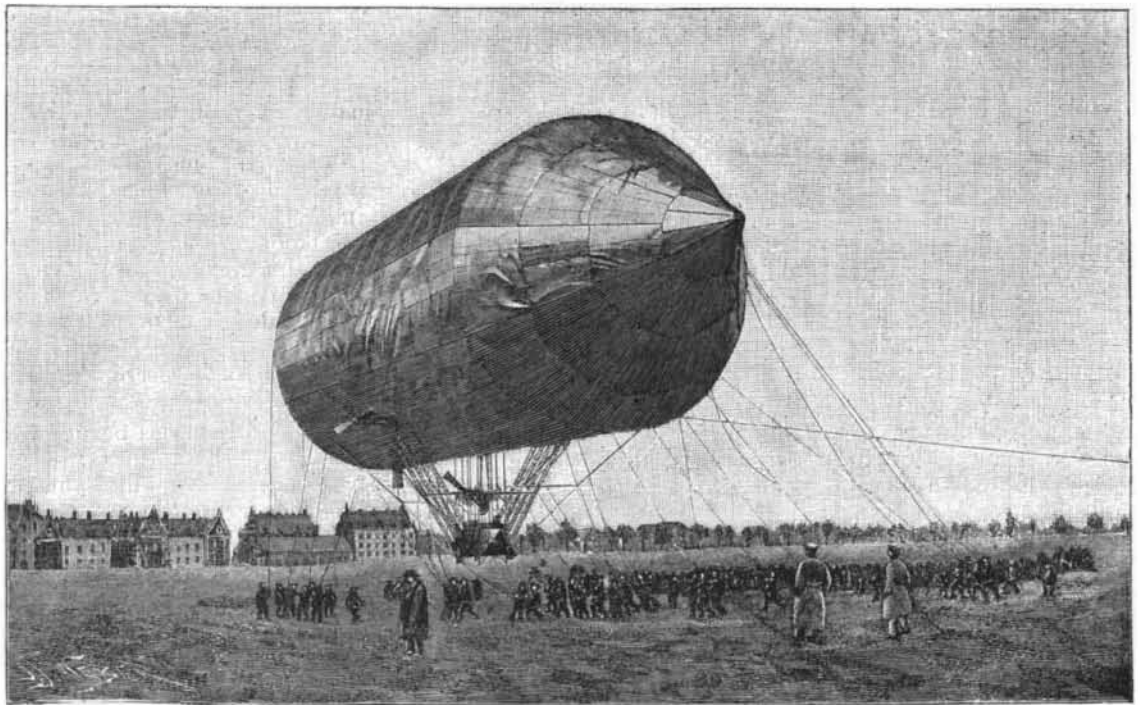
A similar sale took place in February, and others were to follow in July and October.

It is small consolation to us to think that in a few years the price of these luxuries will be prohibitive, or that, unless fashion changes in the direction of seaweeds or turnip tops, there will soon be no more birds to destroy. Nor can we overlook the terrible suffering involved by this enormous slaughter: the young

THE BERLIN ALUMINUM BALLOON.

The idea of constructing a metallic balloon is not by any means new, the first of this type having been constructed by M. Mares-Monges in 1842. It consisted

leather, and the bearings, which weighed only a few pounds and were of brass, the whole of the immense structure was built of aluminum. An idea of the true meaning of this can be gained from the following

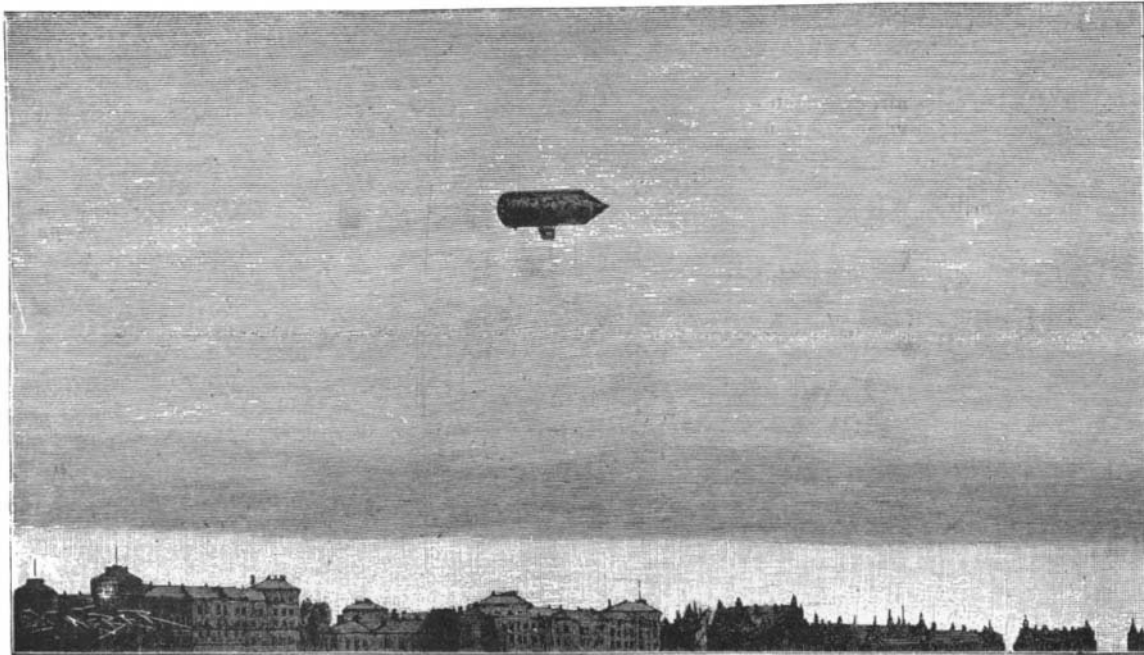
**START OF THE ALUMINUM BALLOON.**

of a large hollow ball, 33 feet in diameter, built of thin sheets of copper, and filled with hydrogen gas.

The progress in the manufacture of aluminum and its ever decreasing cost have led experimenters in aeronautics to regard it as a suitable material for bal-

loons. The body of the ship was 134 feet long, 46 feet high, 42 feet 7 inches wide, and the whole ship with the car weighs 5,720 pounds.

The history of the trial trip, made on November 3, under the direction of the officers of the Royal Prussian Aerial Navigation Department, would probably have been quite different if the inventor and constructor of the balloon had been in the car; but, unfortunately, Herr Schwarz, of Agram, died before the test had been made. The press has made altogether too much of the unfortunate but entirely unnecessary wrecking of the ship, without setting forth the causes thereof; although the ascension, in spite of the unlooked-for ending, demonstrated all that the inventor had claimed. This is the professional opinion, which could be obtained only after some delay. Schwarz had never been able to persuade the officers of the Aerial Navigation Department that his ship had sufficient lifting power to rise from the ground with its motor and passengers; and they maintained that, even if the exceedingly delicate operation of filling the balloon with pure hydrogen by Herr Schwarz's method could be successfully performed, it would be found that the ship was so constructed as to be too heavy to rise. Upon the sudden death of Herr Schwarz, it seemed that his work had been in vain, but his wife, inspired by an unswerving faith in her husband's theories, undertook to complete what he had begun. She obtained permission from the minister of war to have an ascension of the apparatus from the Luftschifferpark under military protection, and the officers of the department afforded her most efficient aid; but she could not overcome their doubt of the lifting power of the ship, and, therefore, in constructing the apparatus, they did away with everything that seemed to them to be at all superfluous. Unfortunately, in this category were included the arrangement employed by Herr Schwarz for securing the driving belt for the wind propellers, the device for regulating the descent and the device for lengthen-

**BALLOON AT ELEVATION OF 800 FEET.**

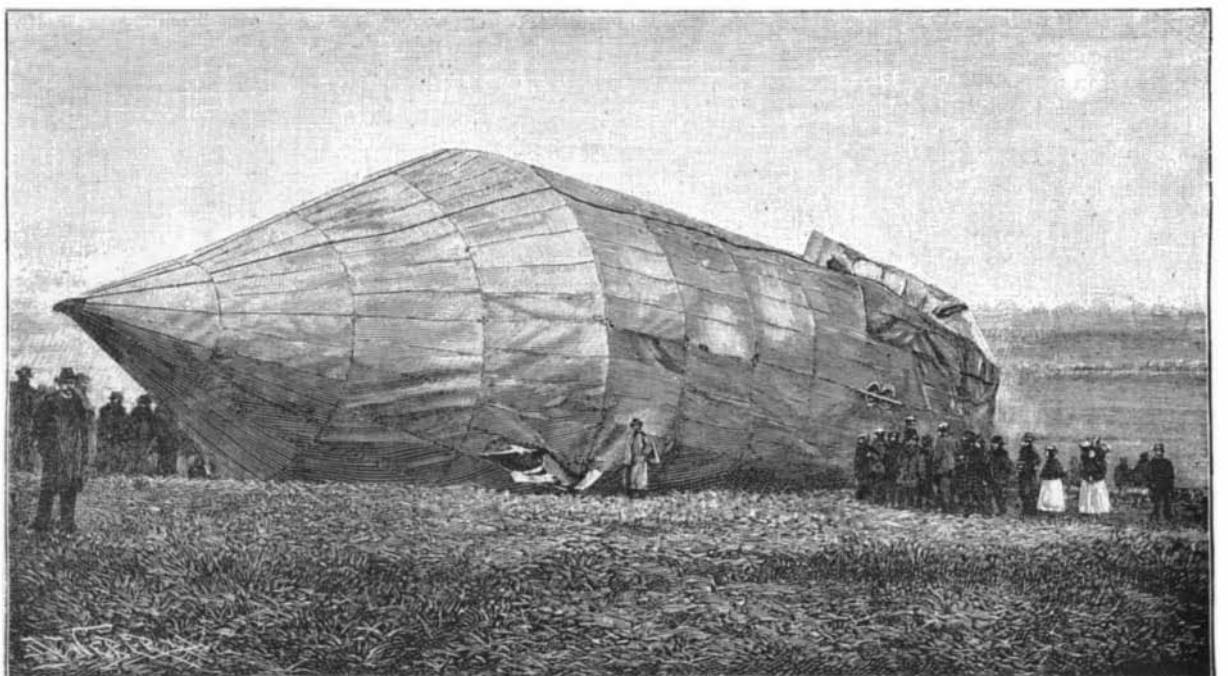
osprey bereft of their parents left to die in hundreds, the heron with the plumes torn from its back, writhing into death.

A New Method of Inducing Sleep.

In the Journal of the American Medical Association of September 25, 1897, Dr. J. B. Learned describes the following method, which he used in his own case. For some years he suffered from insomnia following a fall from his car. He tried many methods of treatment in vain—drugs, hot water and cold water internally and externally, friction, over-feeding and under-feeding, exercise, gymnastics, deep inspirations and numberless mental occupations. At last the following method proved a success. The principle is to induce muscular fatigue by exercises carried out in bed. Lying on his back, the patient first reaches for the foot and head board at the same time. He then raises his head half an inch; at the same time he breathes slowly and deeply about eight inspirations to the minute, which are counted. After about twenty inspirations, the head, which begins to feel heavy, is dropped. The right foot is then raised (the reaching for the boards and counting being continued) and similarly dropped when fatigued. The left foot goes through the same process. The muscles which are used in reaching for the head and foot boards are then relieved, and the body is elevated so that it rests on the head and heels. He then turns on the right side and reaches for the head and foot boards again, and raises first the head and then the foot as before. The same process is gone through on the other side. Thus eight positions have been assumed and a large number of muscles used. If sleep has not been induced, the same cycle is gone over again.

loon construction, and Herr Schwarz, of Agram, designed and built a cylindrical airship of colossal dimensions which recently made a trial trip that ended in disaster.

With the exception of the driving belt, which was of

**AFTER THE WRECK.**