

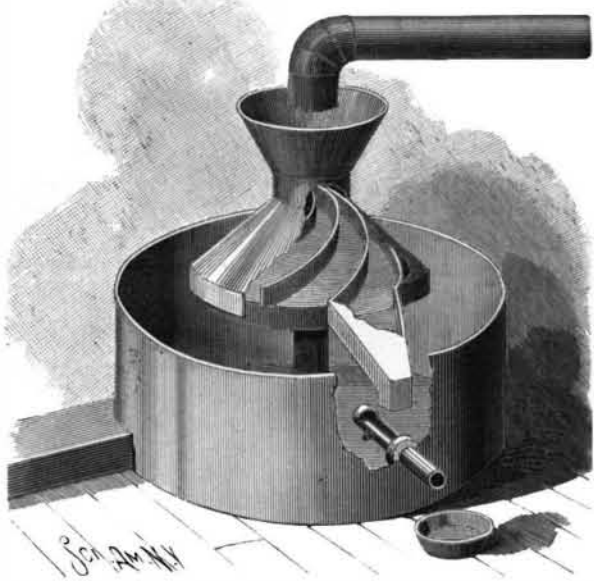
new smokeless powder. It is known as the Maxim-Schupphaus. It is a purely American powder, and in its present perfected form it represents the results of experiments which have been carried on steadily for the past four years. In 1893 the inventors were collaborating in the attempt to find a suitable propellant for firing large masses of high explosives from rifled guns, the object of their search being a powder which would give a less sudden initial acceleration to the projectile, with a more uniformly sustained subsequent acceleration in the gun than was possible with the then known powders. Realizing that the chief trouble with the existing smokeless powders was the serious erosion of the bore due to the high pressure and temperature of the gases, they determined to use gun-cotton, which gives low erosive effects, and to use such a form of grain that the surface at first exposed to the flame of ignition would be relatively small and then increase rapidly as the projectile traveled up the bore.

The theory worked out excellent results on the proving ground, as may be judged from the fact that a 35-pound projectile has been fired from a 4.7-inch gun with a velocity of 2,913 feet a second on a maximum pressure of only 35,000 pounds per square inch. Our new powder is not only free from erosive effects, but it has been proved to be thoroughly stable.

#### A NEW SAMPLING MACHINE.

The accompanying engraving represents an improved sampling machine which is arranged to utilize the pulp or other material as the motive power for setting the apparatus in motion.

The machine is provided with a fixed casing having an outlet for the discharge of the bulk of the material from which the sample has been taken. From the bottom of the casing a post rises upon which a cone-shaped wheel is mounted to rotate. This cone-shaped wheel has spiral ribs terminating in the apex of the



BYRNES' SAMPLING MACHINE.

cone, so that the material or liquid to be sampled and discharged upon the apex through a hopper, is equally divided by these ribs and flows down the sides of the cone in equal quantities between adjacent ribs. One of the chambers formed between two adjacent ribs terminates at its lower end in a sample chute formed with a downwardly-extending spout. A portion of the pulp or other material can thus be discharged into a sample receiver held in the wall of the casing, thence to be conducted to a receptacle outside of the casing. When the material passes down into the spiral chambers, it is evident that a rotary motion will be imparted to the cone-shaped wheel. The material is therefore discharged mostly into the casing, only a small portion being dropped into the sample receiver at each full revolution of the wheel. Any desired quantity can be taken as a sample of the entire bulk, the proportion being regulated by the make of the machine, the number of chambers, the diameter of the wheel, and the opening of the receiver. The apparatus has been patented by the inventor, Mr. Owen Byrnes, of Granite Butte, via Gould, Mont.

#### Important Experiments in Aerial Navigation.

The Engineer reports that, on July 27, a series of experiments in aerial research were conducted in the grounds of Shaw House, near Newbury. The experiments were carried out under the direction of the Rev. J. M. Bacon, Dr. R. Lauchlan, Mr. J. N. Maskelyne, and others, with the advice and assistance of Lord Kelvin, Lord Rayleigh, and other men of science. The balloon was in charge of Mr. Percival Spencer and his brother, and was filled with 40,000 cubic feet of gas. The main object of the experiments was to discover in what measure the intensity of sound is influenced by altitude, by the presence of clouds, etc. The weather proved favorable for the observations, and the ascent was successfully made at twenty min-

utes past five o'clock, the balloon drifting steadily in a northwesterly direction. As soon as the balloon had had a fair start the series of experiments commenced. The first experiment in acoustics was with the voice, followed by five tests with musical instruments, these being succeeded by the discharge of rifles and blasts of the siren from an engine. Then came a rifle volley, followed by a roll of musketry, succeeded in turn by discharges of cotton-powder, four ounces being used in each charge. After this came three further discharges of cotton-powder, with eight ounces in each charge. When the balloon had traveled a considerable distance there were two explosions of cotton-powder with double charges, the final experiment being a comparison between a discharge of four ounces of gunpowder and four ounces of cotton powder. The aeronauts had with them a receiving instrument, and by noting the altitude and the sounds which reached them, took the angular distance. The balloon descended at ten minutes to seven o'clock at North Denford. All the experiments proved highly successful.

#### A New Pompeii.

This title is perhaps an exaggeration, but it is certain that if the published reports are true, the German archaeologists who are excavating on the site of ancient Priene have made a discovery of the highest interest. It is well known that Priene is in Asia Minor, and that the modern city, of Samsoun occupies its ancient site. Several years ago an English expedition unearthed and studied the temple of Minerva, the chief sanctuary of the city, built by order of Alexander; but its ruins, although interesting, were abandoned, and they have since been despoiled by the inhabitants of the neighborhood. In 1895 the Germans resumed the exploration of the region in behalf of the Berlin Museum, at the expense of the Prussian government and under the direction of a young architect, Wilhelm Wilberg. The work of excavation is already sufficiently advanced to enable us to judge of its rare importance; a whole city is being unearthed, in almost as good preservation as Pompeii. And this is the more important because up to the present no similar discovery has ever been made that gives precise indications of the general arrangement of a Greek city, of its public monuments, or its individual dwellings. The city thus exhumed is assuredly of the period of greatest Greek beauty; the streets cross at right angles and are laid out with the greatest regularity, and we can identify colonnades, theaters, market-places, shops, and houses with their decorations and interior arrangement. South of the temple of Minerva has been found the agora, surrounded with great colonnades, while opening on one of its corners is a small square edifice somewhat resembling a theater and constituting perhaps the place of meeting of the city council. It is in admirable preservation, and sixteen rows of seats can be seen still in place. Worthy of note is a vault in one of the walls—a thing extraordinarily rare in Greek architecture. We should add, in closing, that among the structures that have been entirely exhumed is a theater whose scene is intact, which will doubtless solve some of the problems connected with this special part of the Greek theaters.—Literary Digest.

#### A SCRUBBING MACHINE.

To provide a machine for scrubbing floors, so constructed that it will sprinkle water or a washing compound on the floor, take up the water, dry the floor, and deliver the material taken up into a receptacle forming part of the apparatus, Mrs. Hattie E. Lane, of Colfax, Ind., has invented the machine forming the subject of the accompanying illustration.

The apparatus is provided with a frame, in which wheels are journaled. In front of the wheels a drum is mounted, consisting of alternate sections of rubber and bristles, and operated as shown in the engraving. Above the drum a receptacle is located extending forward to some distance, and containing water or some washing compound. A valve, situated in the receptacle, controls the delivery of the water, and is operated from the handle of the machine. When it is desired to open the valve, a lever on the handle is operated, thus acting on the chain or cord connected with the valve. Springs automatically close the valve when the pressure on the lever is relieved. A receiver is suspended from the rear portion of the frame, and has its concave forward end in contact with the floor and with the drum.

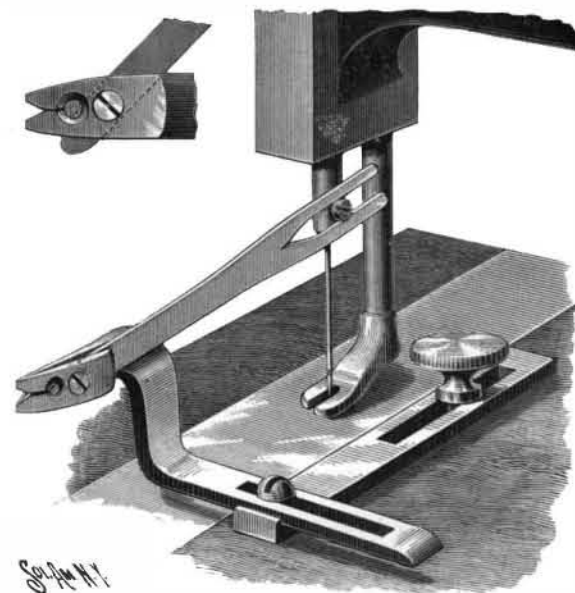
In operation, the valve being open, the machine is pushed along, whereupon water will be delivered to the floor in front of the cleaning drum. The floor will be scrubbed by the brushes on the drum, and will be dried by the rubber strips. The material taken up by the scrubbing drum will be delivered into the receiver suspended in the lower portion of the frame.

This device, it is claimed, will clean a floor as readily and as perfectly as a brush operated by hand.

#### AN IMPROVED SEAM-RIPPER.

In an invention recently patented by Lemuel Merrill, of 52 Federal Street, Boston, Mass., a novel device is provided for ripping seams which is so constructed as to cause a reciprocating knife held between the members of a body-section to cut the threads of a seam at both up and down movements.

In the attachment illustrated, a shield-like device is provided which is formed to receive the seam and which co-acts with the reciprocating ripper-arm. The shield



SEAM-RIPPER ATTACHED TO A SEWING MACHINE.

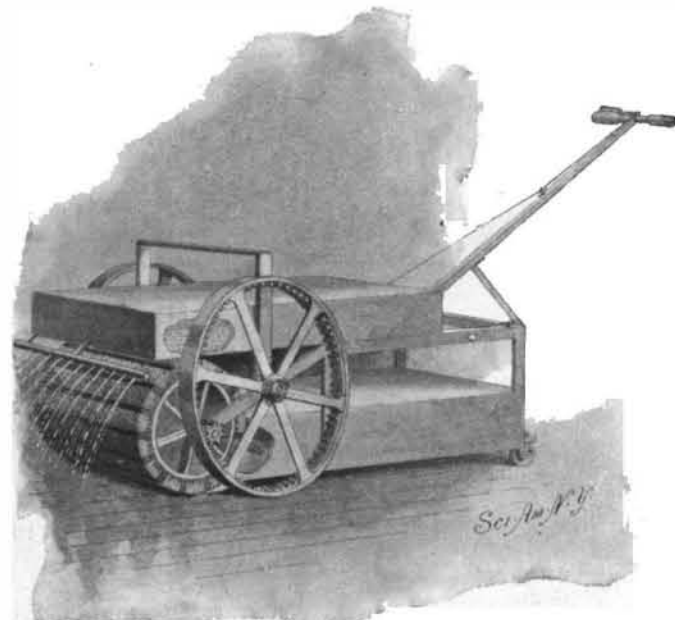
forms part of an attachment adapted to be adjustably secured to the sewing machine, and is provided at its front end with a tapered slot terminating in a circular opening. This circular aperture enables the cut threads to leave the shield readily. The ripper-arm is pivoted to the shield and at its forward end is sharpened to a rounded cutting edge. By its reciprocating movement across the slot of the shield, the arm is enabled to cut both at its up and down movements. As shown in the illustration, the arm may be operated by the needle-bar of the machine, the forked rear end of the arm engaging the bar for that purpose.

In practice the invention is also embodied in a hand ripping device, formed after the manner of scissors.

When used in connection with a machine, both hands are free to guide the work. While the threads of a seam may be readily cut by the knife-edge, there is, nevertheless, no danger of cutting the material, since the knife-edge is protected by the shield.

#### Human Hair.

It is a curious fact that red-haired people are far less apt to become bald than those whose hirsute covering is of another hue. The average crop on the head of the red-haired person is said to be only about 30,000 hairs. Ordinary dark hair is far finer, and over three dark hairs take up the space of one red one; 105,000 are about the average. But fair-haired people are still better off; 140,000 to 160,000 are quite a common number of hairs on the scalp of a fair-haired man or woman. A curious calculation has been made, to the effect that the hairs on the head of a fair-haired person,



A NOVEL MACHINE FOR SCRUBBING FLOORS.

if they could be plaited together, would sustain a weight of something like eighty tons, equaling that of five hundred people.—Medical Record.

ITALY is the first of the powers to learn a lesson from the war. The Navy Department has given orders that wood shall not be used on battleships.