

**MAY'S PATENT BUTTER WORKER.**

Our illustration represents a new butter worker, by the aid of which, the inventor claims, two or three men can work, rework, color, and pack ready for shipment from two to four thousand pounds of butter per day. The machine, it is stated, will work all colors of either soft or hard butter, mixing the same so thoroughly as to cause it to appear freshly churned. The sour milk and water are removed, and the butter, being solidified and condensed, is greatly improved, both in quality and in capability of preservation.

The cylindrical vessel shown is secured to the platform, and within it rotates a central shaft, A. On the inside of the body, and attached to the shaft, are placed, one above another, a series of horizontal and rounded arms, B, each pair of which is located at an angle to the couple next above or below. Across the interior of the vessel, and on opposite sides, are secured the stationary chord pieces, C, also made rounded. The shaft is journaled to the diametrical board, D, and power is applied to its upper extremity by means of a sweep, as shown. The vessel has at the bottom a discharge orifice, E, which is cut obliquely in order to allow the butter to escape freely, as the lower pair of rotary arms carry it around.

The mode of operation consists in placing the butter in the receptacle, where it is successively worked by the arms and bars until it reaches the bottom, whence it emerges by the aperture above referred to. It will be noticed that the entire working parts of the machine are of wood, and that no metal comes at any time in contact with the butter.

Patented, through the Scientific American Patent Agency, March 10, 1874. For further information address the inventor, Mr. Alexander May, No. 419 West Market street, Louisville, Ky.

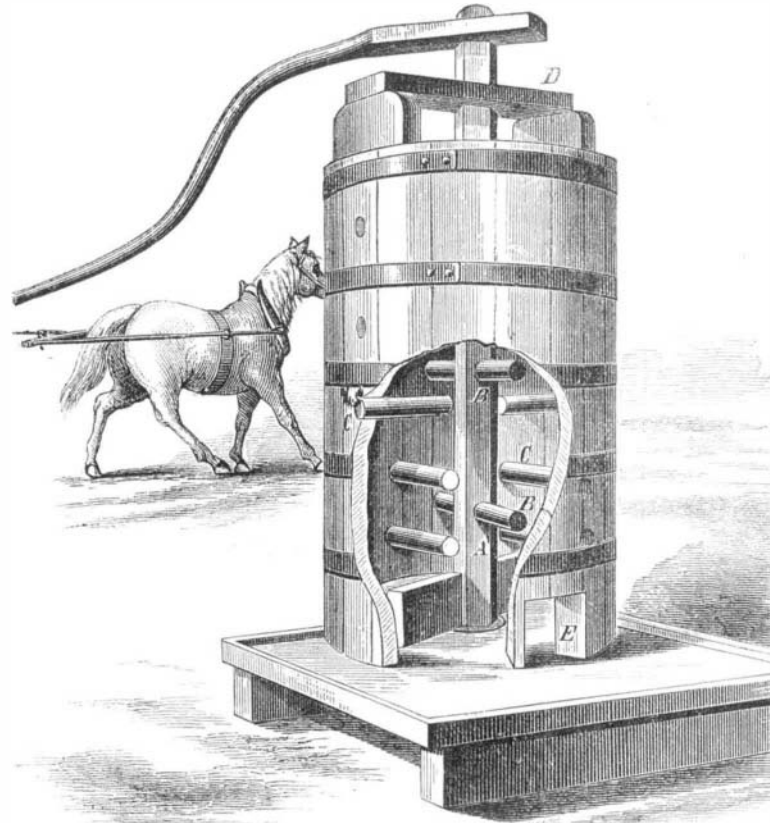
**The American Tin Ware Trade.**

For a long time past one of the best customers of the British maker for tin and terne plates has been the United States of America. At one time we were sending to that country great consignments of tin plate goods in varied shapes and of different values; lately the Americans have learned themselves to use up the tin plates, and now we have them shipping tin plate wares to this country, made from the tin plates with which we have supplied them. In America itself it was at one time thought an extraordinary thing for the Western and Southern States to send into the Northern States articles for which they had before been indebted exclusively to the latter. It was only a few months before that, in conversing with a manufacturer in the Western States of hardware goods at one time obtained by the new world almost solely from Birmingham, we were assured by the American that he should soon be forwarding this same class of goods to compete with those of the Birmingham district in their home market. The goods were not those which have tin plates for their fabric; but what the tin plate makers of the United States are doing would seem to imply that his assurance was something more than empty boasting. The United States manufacturer displays an amount of ingenuity in invention which is but seldom seen in England, and the handicraftsmen in the new world, unlike those of the old, are ready to adapt themselves to a new pattern so soon as it can be shown that it is at all probable to be a success. The American tin plate goods that are now being offered in Birmingham and South Staffordshire are described as simply marvelous, both as to the price of the articles and the ingenuity displayed in their construction. Surely there is something very wrong in this country when the Americans, after buying our tin plates and paying heavier wages for the manufacture of the article, are able to offer it here at prices much under those at which we can produce it.—*The Engineer.*

**DR. MAREY'S CHRONOGRAPH.**

The use of the tuning fork for the measurement of very short intervals of time presents certain advantages which have led to its extended employment in recent chronographic apparatus. Our illustration represents a new instrument of this description, which is an improvement on a device of M. Mercadier, or rather is an attachment to the latter for the purpose of ensuring greater accuracy. M. Mercadier's invention is shown in the upper portion of the engraving, and consists of a tuning fork horizontally placed. One branch is attracted by an electromagnet. Its movement toward the core, however, breaks the current, causing the arms to spring back. This phenomenon is repeated indefinitely, throwing the branch into very rapid vibrations, each of which causes the contact of a platinum wire with a small platinum disk communicating with the battery. Suitable registering devices were connected with this instrument which it is unnecessary here to describe, as Dr. Marey found that its employment was frequently difficult on account of the extremely small amplitude of the vibrations. In order to remedy this defect, the above inventor places, in the circuit of the electromagnet of the tuning fork, a second electromagnet which naturally becomes magnetized or demagnetized coincidentally with the first. The second coil has a single bobbin, and attracts its armature a hundred times per second. The armature moves in a plane parallel to the polar face, and is

carried by a spring. In order to obtain an absolute unison between the two vibrations, the spring is regulated to proper length by means of a delicate screw. The armature being attracted laterally, its sudden stoppage is avoided, and a much larger amplitude is obtained; and by means of a piece of quill, forming a prolongation, it traces curves corresponding to hundredths of seconds on a blackened surface. The electromagnet is carried, as shown in the principal figure, in a handle through which passes the conducting wires establishing the communication with the battery and tuning fork. These wires, which for convenience are united in a



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single cord, may be of suitable length to allow of using the instrument in any portion, for instance, of a room.

If it be desired to measure the exact period of revolution of a pulley and its variations of velocity during its rotation, the face of the wheel is covered with lampblack, and the quill point of the chronograph brought in contact therewith. The tracing will show the angular movement during each one hundredth of a second, enabling the builder, for example, of a machine requiring delicacy of construction, to detect errors which otherwise might escape his notice. By the same means, suitably arranged, Dr. Marey is enabled to govern the movement of an escapement, and hence to regulate accurately the operation of a train of wheels, an application of value in telegraphic instruments.

**Rattlesnakes and Tarantulas in Colorado.**

The *Rocky Mountain Miner and Mechanic*, published at Denver, under the head of "Cyclopædia Colorado," devotes a column or two to describing some of the natural products of that wonderful region. In the last number, the editor speaks of rattlesnakes as venomous serpents, to be found in all parts of Colorado.

He says: "It is popularly supposed that the age of the snake can be estimated by the number of rattles; but this is a mistake, for though these may increase with age, their fragility is such that many may be lost by accident; and moreover, more than one may be added annually owing to the vigor, food, state of captivity, etc., of the reptile—twenty are not unfrequently seen in large specimens, but it

warn animals and man of its vicinity; but it is more likely that its use is to startle the creatures, upon which it preys, from their retreat, and bring them within the reach of its spring; or some other purpose for its own welfare rather than the safety of man. Dangerous as they are, they rarely attack man unless provoked, and are fortunately sluggish in their movements, unable to spring except from a coil, and are disabled by slight blows. They are viviparous, the eggs being retained until hatched, and the young expelled alive. In winter they retire to holes in the ground, and there remain torpid, several interlaced with each other. They are unable to climb trees in pursuit of prey, and do not follow a retreating animal that has escaped their spring. The most common of the rattlesnake tribe found in Colorado, the prairie rattlesnake (*c. tergeminus*), is a little over two feet long; it is cinerous above, with a triple series of dark brown spots, and a double series of dusky spots below; it is fond of hiding in the holes of the prairie dog.

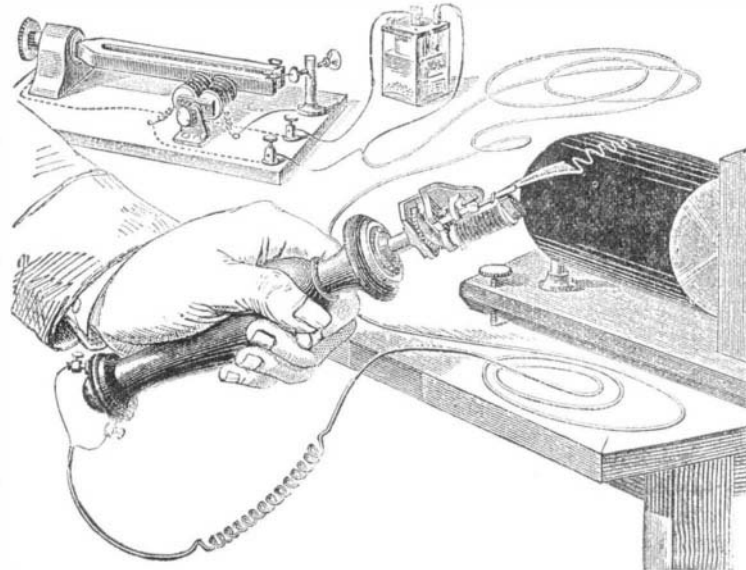
From the same source and under the same heading, we learn something of the tarantula or tarentula, "which," the writer says, "is a terrestrial hunting or wolf spider, belonging to the genus *lycosa*, the *l. tarantula* (Laur.) It is the largest of spiders, measuring 1½ to 2 inches in the length of the body; the color is ashy brown above, marked with gray on the thorax, and with triangular spots and curved streaks of black bordered with white on the abdomen; below saffron colored, with a transverse black band. It received its popular name from being common in the vicinity of Tarants, in South Italy. It makes no web—wandering for prey which it runs down with great swiftness, and hiding in holes in the ground and crevices lined with its silk; there is one spiracle on each side, one pulmonary sac, and eight eyes; it is very active and fierce, and the females defend their young and eggs with self sacrificing bravery. Its bite is supposed to be highly poisonous. The *l. Carolinensis* (Bosc) is called tarantula in the Southern States; it attains a length of 2 inches, with an extent of legs of 4; it is mouse-colored above, with white sides and whitish dots and lines on the abdomen; below, blackish; legs whitish tipped with black. It makes deep excavations

in the ground, which it lines with silk; the females carry their young on the back, giving them a hideous appearance, as if covered with warts; the young run off in all directions if the mother be disturbed. Its poison is active. Both kinds are found in Colorado, but the latter are the most numerous. A favorite haunt is the hole of the prairie dog, where the rattlesnake, the tarantula, and the dog may generally be found sociably living together.

[It would seem from the above that the attractions of Colorado are not strictly confined to its grand scenery or its agricultural and mineral products, but that the naturalist may there find specimens venomous enough to gratify the ambition of the most enthusiastic student of Nature.—EDS.]

**Expansion of Steam.**

At a recent meeting of the South Midland Institute, Mr. Bernard Walker said that the subject of economizing fuel in the production of motive power, or, in other words, the principal points in the construction of steam engines, on which depended their wastefulness, was one of great importance, and nowhere more so than in that district. Professor Joule had calculated that the best engines at present in existence did not render available more than from one tenth to one twelfth of the motive force stored up in the fuel. Remembering that the ordinary steam engines used in manufacturing, in mines, and on railways, consumed at least four times more fuel than if they had been made according to well known scientific principles, the national loss thus arising must strike every one as enormous, but the loss was far greater by the use of ill constructed engines. In this part of the country, in the past, consequent on low priced fuel, this matter had been disregarded. Now, however, with costly fuel, it behoved every one to consider the avoidance of waste. From considerable acquaintance with the kind of steam engine used in England, he assumed that few were taking less than from 7½ to 10½ lbs. of coal per horse power per hour. Those of the best construction, however, were being worked with as low a consumption as 1½ lbs. to 2 lbs. of fuel. Mr. Walker thought simple, plain, easily managed engines, that, with ordinary care, would not require more than 2½ lbs. to 3 lbs. of slack per horse power per hour, could be made. After pointing out the importance of all those numerous items included under the head of "good workmanship," and appealing to the members to detail the results of their observations as to the perfection being attained in these respects, he drew attention to the great saving that was being effected by what was termed working steam engines expansively, and the principles therein involved. Mr. Walker then showed cogent reasons for expecting better results from double than single cylinder engines. The drawback to their employment appeared chiefly due to their greater first cost and expense of maintenance, but in very many—nay, most—cases, the saving of fuel thereby gained far more than compensated for the interest on first cost and amount of repairs.



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would be incorrect to conclude from these that the snake was neither more nor less than twenty years old. As the bite of these reptiles is speedily fatal to small animals, it has been generally believed that the use of the rattles is to