A PERCOLATOR PACKAGE FOR MAKING COFFEE.

The accompanying illustrations represent a novel percolator package or bag which has recently been invented by Henry M. Humphrey, 4 to 8 Water Street, Brooklyn, New York, and which is designed to contain the coffee to be boiled or infused. The bag is made of a porous fabric, such as muslin or cheese cloth, and is provided with a weight which keeps it in proper position in the water. The weight assists the package in its downward course, and serves constantly to change the position of the package, so that the hot water is always in contact with the coffee.

Of the accompanying illustrations, showing the various positions assumed by the percolator package in a coffee-pot, Fig. 1 represents the first action of the weight in drawing the slack bag down into the water. In a few minutes the bag assumes the position indicated in Fig. 2. As the water boils up the bag rises, as shown in Fig. 3, the weight serving to keep the swelling coffee in the hottest part of the water. When the boiling is stopped, the bag sinks to the position represented in Fig. 4; and the coffee is then ready to be served.

Although it is intended that a clean percolator bag be used every time that coffee is made, it is, nevertheless, possible to use a bag several times. This new

HUMPHREY'S PERCOLATOR PACKAGE FOR MAKING COFFEE.

method of making coffee, it will be observed, does away with the possibility of leaving grounds in the coffee-pot, and does not require the use of eggs in causing the coffee to settle.

The Inventors' Bank in Austria.

The Austrian government has granted provisional concession for an Austrian inventors' bank. The company's capital is to consist of $100,000 in shares of $80 each. The amount can be eventually raised to $200,000 and to $400,000 on ratification by the government and stockholders. The statutes designate the aim of the company to be the utilization of inventions and patents for the mutual benefit of the inventor and the bank, which may involve the erection of factories for such patented articles, the founding and management of trade enterprise for the sale of these articles, and the right of the bank to carry on all other legally licensed businesses which are adapted to encourage the activity of the inventors in Austria. If the capital for the new enterprise is not procured at the end of six months, the concession will be withdrawn. Such an establishment, if indorsed by the government and administered by fully reliable parties, cannot but prove of interest to the inventor.

Trade Relations Between Germany and United States.

A good deal of unnecessary anxiety seems to be exhibited both in Germany and in the United States about the trade relations between the two countries. Some figures just prepared by the Treasury Bureau of Statistics showed that the supposition that American trade in Germany or German trade in America is being disturbed or depressed by existing conditions seems to be unfounded. Certainly the United States is giving to Germany a larger percentage of her import trade than ever before and is selling to Germany a larger percentage of her exports than ever before. American exports to Germany increased over 11 per cent in the past six months compared with the corresponding six months of the preceding year, which of themselves were phenomenally large, and the imports from Germany into the United States in the past six months were nearly 25 per cent greater than those of the corresponding six months of last year. The share of our import trade given to Germany has steadily increased during the past decade, as has also the share which she takes of our exports. A decade ago 10 per cent of our imports was taken from Germany, while now 13 per cent comes from that country; a decade ago 8 per cent of our exports went to Germany, now over 13 per cent goes to that country, and in the last half of the calendar year 1897 our exports to Germany were $32,632,122, and in the last half of the calendar year 1898 were $40,615,770, an increase of nearly 25 per cent. Our exports to Germany in the last half of the heavy export year 1897 were $77,132,053, and in the last half of 1898 were $85,903,120. Even in meats and provisions the exports to Germany in 1898 show a marked gain in nearly all classes. In salted or pickled beef the exportations increased more than 25 per cent in 1898 over 1897. Exports of bacon increased 25 per cent, or nearly 10,000,000 pounds; those of hams increased from less than 5,000,000 pounds to nearly 12,000,000 pounds; those of pork, fresh and salted, from less than 3,000,000 pounds to nearly 13,000,000 pounds; those of lard, from 205,000,000 pounds to 238,000,000 pounds; while in fruits and nuts the exports of 1898 were nearly 50 per cent in excess of those of 1896, and but slightly below those of 1897.

A SIMPLE PIPE CUTTING AND THREADING TOOL.

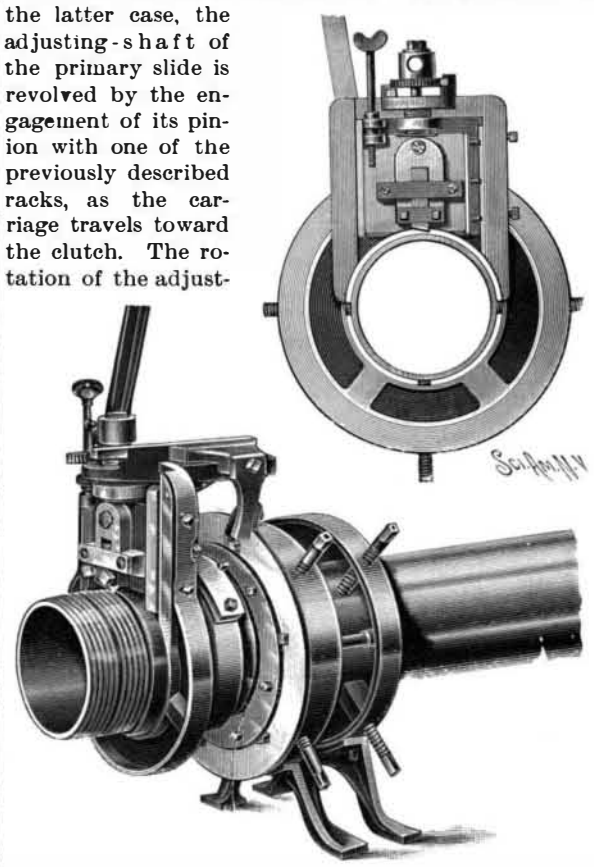
The improved pipe cutting and threading tool illustrated herewith is designed to be used on pipes of various diameters, and to take the place of the usual costly pipe-cutting machinery which can be used only in the shop.

The tool is designed to be attached directly to the piece of pipe which is to be threaded or cut off, and is held in place by means of a universal chuck having a threaded and flanged collar surrounding the pipe. In connection with the chuck, there is also provided a carriage having a threaded sleeve engaging the collar. Upon the carriage two slides are mounted—a primary slide and a secondary slide. These slides are connected by an adjusting bolt having a swivel whereby the two slides can be separated and drawn together. By means of this device the two slides can be separated so as to adjust the cutting-tool nearer to the center when it is desired to thread a smaller pipe. The primary slide is directly in contact with the carriage, and the secondary slide is mounted to move on the primary slide. The primary slide may be moved toward or from the pipe by means of a radial adjusting shaft. To the secondary slide the tool-holder is pivoted.

The carriage has a longitudinally extended portion which is provided with guides receiving two rack-bars which extend parallel with the pipe and are adapted to be engaged by a pinion on the upper portion of the adjusting-shaft of the primary slide. By means of this construction the threading or cutting tool can be automatically fed.

The carriage, the slides and the tool are made to travel by means of a long handle, a portion of which is shown in the illustration. As the carriage passes about the pipe it is gradually worked toward the clutch, as the sleeve on the carriage moves along the collar of the clutch.

The tool may be fed manually or automatically. In the latter case, the adjusting-shaft of the primary slide is revolved by the engagement of its pinion with one of the previously described racks, as the carriage travels toward the clutch. The rotation of the adjusting-shaft will cause the tool to be automatically fed toward the pipe in order to cut a taper thread. The tool may be fed away from the pipe by bringing the other rack into engagement with the pinion. When it is desired to cut a pipe, the carriage-sleeve is loosened so that it will not turn with the carriage; by this means the carriage will be held in one position relative to the pipe, and the cutting-tool may be fed inwardly by hand, until the pipe has been severed.



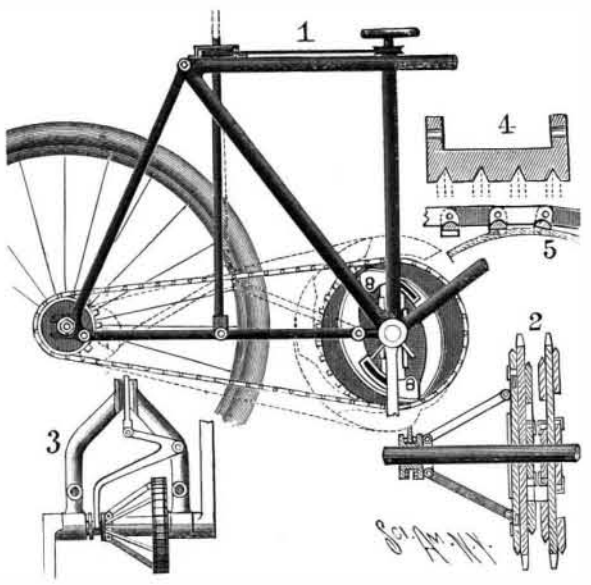
A SIMPLE PIPE CUTTING AND THREADING TOOL.

The tool has been patented by the inventors, Ferdinand C. Walter and Herman F. Repkow, of 149-151 East Huron Street, Chicago, Ill.

A VARIABLE BICYCLE DRIVING-GEAR.

An ingenious mechanism has been invented and patented by Charles G. Evans, of Nelson, British Columbia, Canada, by means of which the driving-gear of a bicycle may be changed to any degree of speed between two extreme points.

Fig. 1 is an elevation showing the device applied to a bicycle. Fig. 2 is a sectional view of the sprocket-wheel. Fig. 3 is a fragmentary front elevation showing the means for controlling the sprocket-wheel. Fig. 4 is a cross-section of a link of the sprocket-chain. Fig. 5 is a detail section showing the action of the sprocket-chain on the sprocket-wheel.



EVANS' VARIABLE BICYCLE DRIVING-GEAR.

From the top bar of the bicycle there extends downwardly a vertical front brace, forked at its lower end to carry the crank-shaft. From the rear end of the top bar there extends a diagonal brace likewise forked and joined to the fork of the previously mentioned brace. The rear wheel is held in a fork pivoted to the rear end of the top bar. For the usual back stays of the bicycle, toggle-links are substituted, which are pivotally connected with a forked, link-controlling rod running vertically through the top bar. On the rear portion of the top bar is a nut engaging a thread on the link-controlling rod. The nut is grooved to receive a band which runs to a pulley carried on the front portion of the top bar and operated by a hand-wheel. The hand-wheel also controls a rod, which runs through the front brace, and which is provided at its lower end with a bell-crank lever, engaging the sprocket-operating devices (Fig. 3).

The main driving-wheel consists of two sprocket-sections, as shown in Fig. 2, on each side of which sections, extension plates are held to slide. These plates are pivotally connected with links, which are in turn pivoted to a collar sliding on the crank-shaft and engaged by the lower member of the bell-crank lever, shown in Fig. 3.

By turning the hand-wheel on the front portion of the top bar, the rod extending through the forward vertical brace will be caused to operate the bell-crank lever in order to adjust the sprocket-wheel. When the hand-wheel is turned in one direction, the collar of the crank-shaft will slide and cause its links to force the extension plates radially outward, as shown by dotted lines in Fig. 1. When the hand-wheel is turned in the opposite direction, the extension plates will be retracted.

The sprocket-chain, as indicated in Fig. 4, consists of links, the under surfaces of which are formed with four V-shaped grooves running longitudinally with the chain and designed to engage the edges of the extension plates. When the plates are extended in the manner before described, they will grip the four V-shaped grooves of the chain links as shown in Fig. 5. Simultaneously with the extension of the driving-wheel, by means of the hand-wheel, the toggle-links between the rear wheel and the crank-shaft will be raised by means of the rod pivoted to their inner ends and connected with the hand-wheel by the band passing around the rod-nut and the hand-wheel pulley. In this manner the variations in diameter of the driving wheel and the change in position of the rear wheel are compensated for.

It will be observed that the gear is not limited in its changes to a fixed set of speeds, but that the adjusting devices and the construction of the driving sprocket-wheel enable the bicycle to be geared to any degree within the two extremes.

AN Italian medical journal states, according to The New York Medical Journal, that while water will not quench the flame of burning petroleum in a limited space, milk accomplishes the object by forming an emulsion with the oil, disturbing its cohesion, and thus attenuating the combustible element.

Science Notes.

The statue of Von Helmholtz by Herter is completed. It will be placed in the court of the University at Berlin, between the statues of the two Humboldts.

Vienna has begun the construction of bicycle paths through the streets. Ground has been conceded for the purpose of building a new street on condition that a strip be prepared for the use of bicyclists.

A young French artist is the discoverer of a fine and genuine example of the Spanish painter Velasquez. The canvas was found on a recent tour to Spain. It is a life sized portrait of a man and is in the best style of the master. It has been submitted to eminent critics who have pronounced upon its genuineness.

The city councilors of Ulm, Germany, have decided to utilize the spire of their magnificent cathedral as a meteorological observatory. The spire is one of the highest buildings in the world. The instruments will be supplied by the Royal Observatory at Stuttgart, and the registrations will be made by the watchmen of the cathedral under the direction of Dr. Schimpf, a meteorologist. Next to the Eiffel Tower in Paris, the cathedral spire of Ulm will be the highest artificial post of meteorological observation in the world.

Letters have recently appeared in The London Lancet, in reference to the colors of newly born negro children. Several medical men have given the result of their experiments, and the evidence shows that the children are of the color of a light quadroon. It is recorded, in a paper published in The Journal of the Anthropological Institute, of the natives of the Warri district of the Niger Coast Protectorate that when pure negroes are born they are pink like young rats, but at the end of three or four months they become black. From this it would seem that atmospheric conditions seem to be necessary to produce the full black colored negro.

The Park Department of Boston has for a long time thought that parks were something more than simply inclosures where citizens and their children could walk dressed up in their best and look at the grass and trees. Playgrounds have been provided in different parts of the city and in these the children can play in the sand and make mud pies to their hearts' content, while older ones have outdoor gymnasiums and ball grounds to attract them from the sickening and vicious life of the pavements. The idea is an excellent one, as it is a one-sided policy to neglect a child's physical development while spending large sums upon the equipment and maintaining of schools for its mental training.

Four submarine mines broke away from Castle Island and floated on the beach at Marine Park, at South Boston, Mass. For a time it was thought they were floating barrels, but when their real nature was discovered they were taken to a place where there would be no danger of premature explosion. It appears that the mines had been anchored in a little cove at the southerly end of Castle Island. They were placed there in order that they might be exploded as soon as the weather permitted. The storm was sufficient, however, to sever the mooring lines which held them together as a group, which accounted for their going adrift.

A very curious case of telegraphic disturbance is reported from Utah, where the Oregon short line lost six telegraph wires for a distance of eighty miles north of Ogden, Utah. It was found on inspection that the cross arms and insulators were heavily coated with salt varying from one-sixteenth to a quarter of an inch in thickness. This coating, when wet, taken in connection with the snow lying on the cross arms, formed a dead cross. During the middle of the day, when the sun was shining brightly, the salt appeared to dry out and the wires could be used to some extent. When the cause of the trouble was determined, an engine was started out equipped with a large hose which was used with hot water for washing off the coating. The salt was carried by the winds blowing over the Great Salt Lake, and as salt is a conductor of electricity, the short circuiting of wires is easily explained.

A cable dispatch from Paris, dated January 28, says that an important discovery was announced in the French Academy of Medicine, by M. Georges Jaubert. He has been experimenting on the supply of air, or the renewal of oxygen in atmospheric air for the use of a man in a hermetically inclosed space like a diving bell. He believes that 79 per cent of nitrogen contained in respirable air remains intact after 21 per cent of the oxygen has been consumed, and the same nitrogen mixed with another fresh supply of oxygen becomes respirable air when the carbon dioxide and the water vapor produced by breathing are removed. He found that his hypothesis was correct, and it is stated that he had discovered a chemical substance which by contact with the atmosphere clears the vitiated air of all the impure gases produced by respiration and refurnishes automatically the requisite quantity of oxygen. The author states that six or eight pounds of this substance will enable a man to live for a whole day in a diving bell.

Miscellaneous Notes and Receipts.

The Porcelain Gate at Nanking.—In 1430 of our era, after nineteen years of incessant work and an expense of almost $4,000,000, the Chinese government finished the wonderful porcelain gate of Nanking, which remained in existence until 1856, i. e., for almost four and one-half centuries. It was octagonal in shape, 260 feet in height, having nine stories, each with a cross and a gallery. One hundred and fifty-two bells were fixed thereon in such a manner that every motion of air moved them to and fro, causing a constant ringing. —Keramische Rundschau.

A quickly hardening cement is obtained, according to the Deutsche Maler Zeitung, by cooling off blast furnace slag in the promptest manner. The slag sand thus obtained is mixed with slaked lime and well intermixed in mortar engines. This mortar is allowed to harden in moderately thick layers on the paved ground, and after solidifying is broken into pieces of suitable size. These are burned in a furnace at red heat and then ground in mills into fine powder. By regrinding cement already solidified, and the addition of slag sand and lime, it is in one's power to more or less retard the solidification.

A new coating, which is said to successfully protect posts and other timber surrounded by earth from rotting, is given by the Baugewerkszeitung. Take resin, 50 parts; finely crushed chalk, 40 parts; fine white sharp sand, 500 parts; linseed oil, 4 parts; native red cupric oxide, 1 part; and sulphuric acid, 1 part. First heat the resin, the chalk, the sand, and the linseed oil in an iron kettle, then add the oxide and the sulphuric acid with caution, mix everything carefully and paint the wood with the hot mass, using a strong brush. If the mixture is not liquid enough, it is diluted with a little linseed oil. When the coating is dry, it forms an extremely hard varnish, which allows no moisture to enter.

Innovation in Decorating China.—The process of porcelain painting heretofore consisted in baking the moulded porcelainware at once with the glaze and to paint the finished article afterward with colors, which were then burnt in at a slight heat either in groups or singly in succession, thus not infrequently causing the piece to crack and destroying the whole work of the painter. The new method is based on colors which are applied on the dead-baked, unglazed porcelain, the so-called bisque, and are burned in simultaneously with the glaze in the sharp fire at a temperature of 1,600° C. A greater permanency of the decoration is insured thereby and the colors protected by the glaze receive luster and adhere more intimately to the porcelain, because they are fused with the glaze. The whole is of a handsome harmonizing effect which is more adapted to the article than that produced by the former method. The said process relies on the resistance of the new colors to such high temperatures as are necessary for the glazes, while the old colors used heretofore were destroyed at considerably lower temperatures.—Zeitschrift des Vereins Deutscher Zeichenlehrer.

Decorating Glass and Distinguishing False Diamonds by Means of Aluminum.—According to a discovery by Mr. Charles Margot, assistant at the physical cabinet of the Geneva High School, aluminum seems to be destined to play an important part in the decorative arts. Mr. Margot found that, with a pencil of aluminum, distinct writing can be done on smooth surfaces of materials containing silicic acid, such as glass, porcelain, etc., and that the letters adhere so firmly to the respective materials that even continued rubbing with moist substances will not remove them. If the characters are treated with strong hydrochloric acid or caustic potash, the metal disappears gradually, but leaves on the writing surface traces as if etched. Hence the soft metal must actually enter more or less into the hard, siliceous substance by virtue of a yet unexplained power. An indispensable condition for the production of distinct characters or designs is a most thorough cleaning of the surface and the removal of even the slightest traces of grease by polishing with chalk, as even the thinnest grease layer would disturb an intimate connection between surface and pencil. Shortly before writing the material is coated with a thin water layer by breathing on it, whereby an easier touch of the pencil is effected. The metallic characters and designs can be given such a luster by treatment with the burnisher and oil that it is not possible to distinguish them from works of inlaid silver. Magnesium, cadmium, and zinc also possess this writing capacity for glass and similar materials, but their easy oxidability renders them too perishable and without permanent gloss.

Furthermore, this property of the said metals to act upon substances containing silicic acid can be practically utilized for distinguishing genuine diamonds from the imitation article. The latter, as regards fire, cannot, sometimes, be distinguished from genuine ones, although they are but paste, as a rule. But they are characterized as such, beyond a doubt, by aluminum, magnesium, cadmium, and zinc pencils.—Deutscher Uhrmacher Kalender.

Great Britain Our Best Customer.

Great Britain continues to be the greatest customer of the United States, despite the fact that our purchases from her continue much below those of former years. The figures of the Treasury Bureau of Statistics covering the calendar year exports and imports show that our sales to the United Kingdom in the year 1896 were $538,661,787, against $482,695,024 in 1897, while our imports from Great Britain in 1898 were but $111,361,617, against $159,002,286 in 1897. Thus our sales to the United Kingdom are nearly five times as much as our purchases from her. The exports to the United Kingdom increased $56,000,000 over those of 1897, while at the same time the imports from that country into the United States were decreased $48,000,000.

The following table shows the value of leading articles imported into the United Kingdom from the United States in the calendar year 1898 compared with 1897, as shown by the "Account of Trade of the United Kingdom" for the month of December, and the calendar year, just received by the Treasury Bureau of Statistics:

Articles	1897	1898
Wheat	£20,193,864	£24,743,021
Bacon	5,353,624	6,439,239
Lard	1,927,162	2,796,281
Copper, unwrought	1,474,578	2,058,820
Raw cotton	24,557,513	27,513,032
Leather	2,606,406	3,036,511
Hams	3,411,559	3,651,414
Hops	280,453	838,074
Tallow and stearine	240,617	538,243
Fresh beef	4,609,130	4,677,341
Indian corn	6,623,230	7,314,935
Oats	1,913,478	2,294,021

These reductions in our imports from the United Kingdom are, however, merely an incident of the general reduction in our imports, which during the calendar year 1898 were $107,637,000 less than those of 1897. Indeed, the United States is proportionately to her imports a better customer of the United Kingdom than the average foreign country. The countries of the world, omitting the British colonies, took but about 15 per cent of their imports from the United Kingdom, while the United States in 1898 took over 17 per cent from the United Kingdom. Indeed, our purchases from that country were far in excess of those from any other part of the world, being 50 per cent in excess of those from Germany, double those from France, more than the total from Asia, Africa, and Oceanica combined, and more than one-third of the entire importations from Europe.

The reduction in our purchases from the United Kingdom during the year 1898 has been altogether in the class of articles whose manufacture is being increased in the United States, and in certain raw materials of which last year's importations were in the early part of the year abnormally large, as shown by the following statement of exports from the United Kingdom to the United States given in the official reports of the British government for the year ending December 31, 1898, compared with those of 1897:

Articles	1897	1898
Beer and ale	£159,796	£146,113
Salt	94,405	81,146
Spirits	160,242	145,941
Wool, sheep and lamb's	1,238,285	128,503
Cotton piece goods	1,508,246	1,247,856
Jute piece goods	1,253,494	840,198
Linen piece goods	1,925,861	1,634,288
Worsted yarn	67,623	13,475
Woolen tissues	868,574	276,501
Worsted tissues	2,431,221	764,761
Tin plates and sheets	927,751	683,913
Alkali	439,706	169,221
Bleaching materials	236,886	194,309
Earthen and china ware	643,323	534,209
Carpets	53,970	43,699
Worsted yarn	67,623	13,475
Apparel and slops	54,380	46,462
Paper	58,951	47,285
Cement	107,177	87,875
Hardware, unenumerated	154,463	85,891

A Locomotive for Columbia University.

A full sized locomotive, built and presented by the Baldwin Locomotive Works, has recently been placed in the laboratory of mechanical engineering at Columbia University, and will be used to give the students proper instruction in the construction and operation of locomotives. It has been set in position on a short length of track at the western end of the engineering laboratory. Of course, means must be provided to prevent any actual forward movement of the engine, and this is accomplished by a set of friction wheels which support the driving wheels and are free to revolve with them. Resistance to these wheels is obtained by four large brakes which are each capable of taking up 400 horse power. They also act as dynamometers and serve to measure the power. When the locomotive is running at a speed of 40 to 45 miles, 1,600 horse power has to be taken care of. There is also a draw-bar pull amounting to 20,000 pounds. The measuring device is applied so that the hauling power of the engine at various speeds can be ascertained. The mechanical engineering laboratory will soon be one of the finest equipped laboratories in the country, if not the finest.