

A bedding of concrete 3 inches or more in thickness was made for each of the large stones. The use of cement enabled unskilled laborers to perform much of the work. Stone masons were only employed on the facings. Wages were \$1.75 for laborers; stone masons were paid from \$3 to \$3.50 per day. The total cost was somewhat below \$200,000.

The capacity of the reservoir created by this dam is 10,500 acre feet, equal to 3,430,000,000 gallons of water. At the ultimate height, 160 feet, the water inclosed would be fully three times greater. At ordinary requirements this would irrigate 15,000 acres.

The above particulars of the enterprise are from a

**A FEW NEW INVENTIONS.**

We give a group of illustrations of patented inventions taken from patents recently issued from the United States Patent Office.

The selection has not been made with the view of showing any special class of inventions, but merely to show the great and diversified activity that prevails among inventors.

**GAS EXHAUSTING APPARATUS.**—This exhausting apparatus is designed for use in connection with the exhausting of the bulbs of incandescent electric lamps.

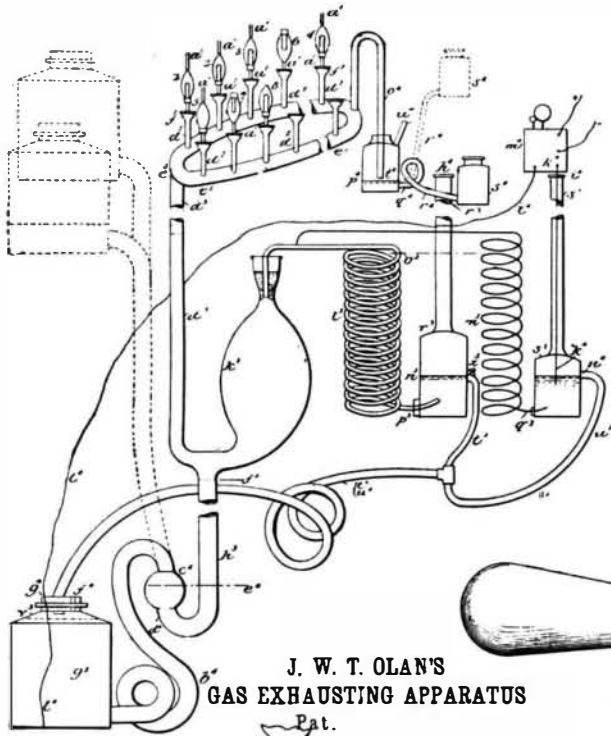
It has many features in common with other mercurial pumps, also many that are novel. It quickly produces

or one ten-thousandth of the original quantity of gas, and so on until, after the tenth manipulation, the residual gas in the bulbs and ring, e<sup>2</sup>, will be one-quintillionth of said original quantity.

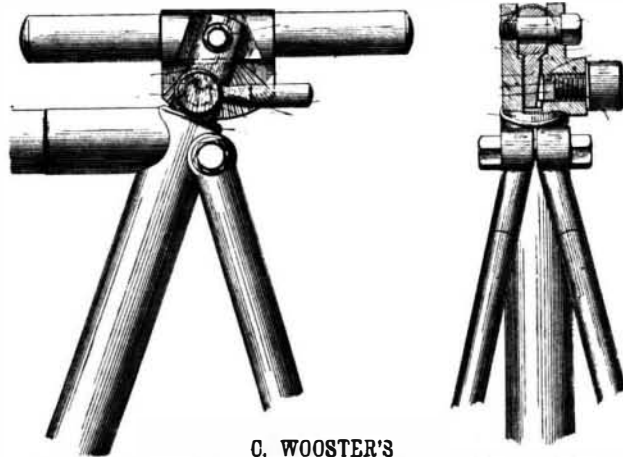
J. W. T. Olan, of New York, is the inventor of this apparatus.

**TILTING SADDLE BAR AND SEAT POST FOR BICYCLES.**—The object of this invention, which has been patented by Charles Wooster, of New York City, is to secure an easy, adjustable saddle which may be rendered adaptable to any rider, or to the same rider under different circumstances.

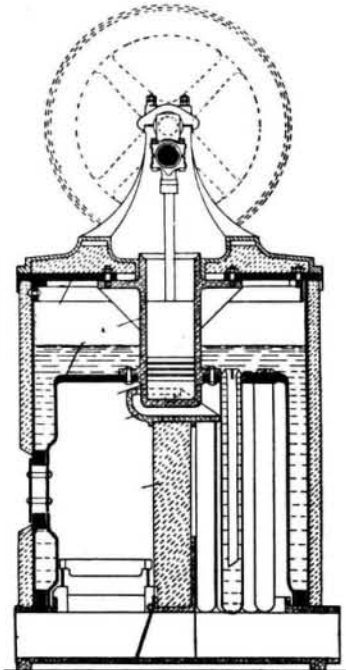
The seat bar is jointed to the saddle post and pro-



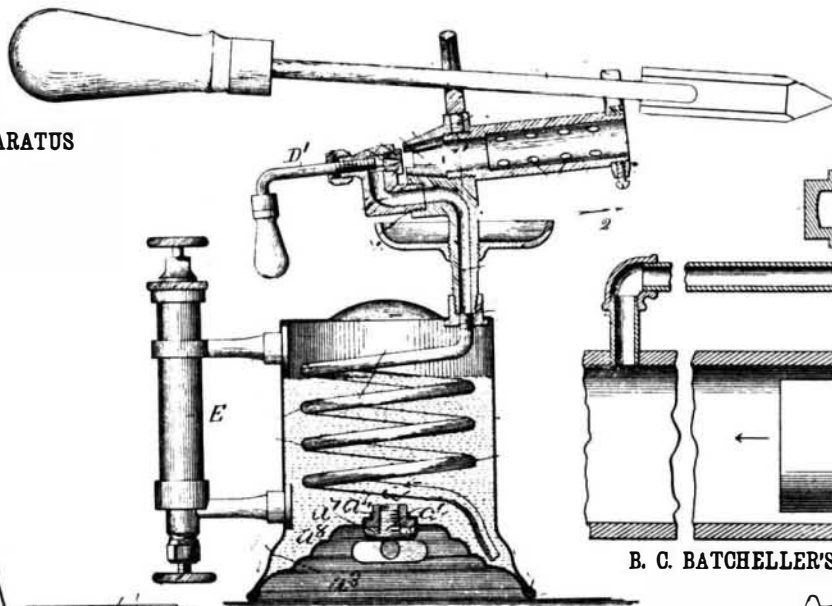
J. W. T. OLAN'S GAS EXHAUSTING APPARATUS Pat.



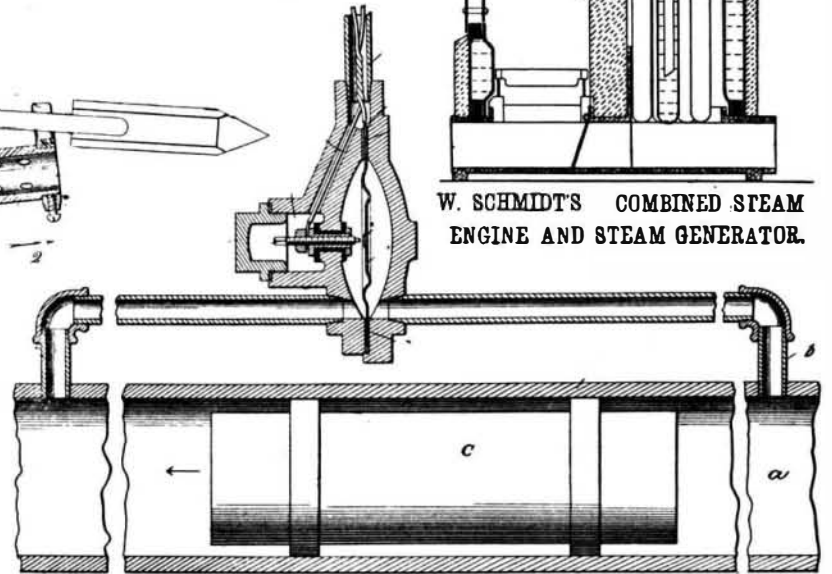
C. WOOSTER'S TILTING SADDLE BAR AND SEAT POST FOR BICYCLES.



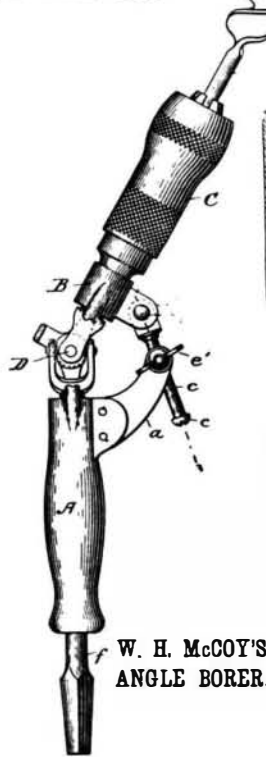
W. SCHMIDT'S COMBINED STEAM ENGINE AND STEAM GENERATOR.



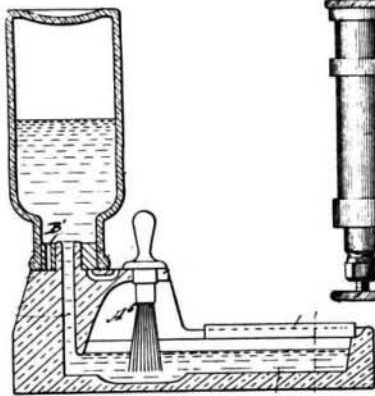
J. C. DUPEE'S BRAZING APPARATUS.



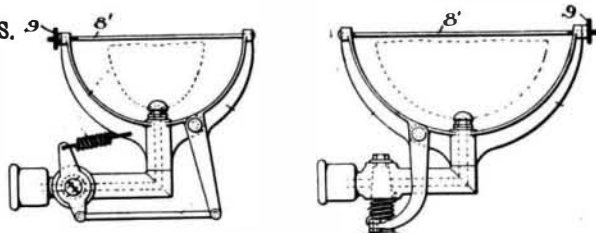
B. C. BATCHELLER'S ELECTROPNEUMATIC CIRCUIT CLOSER.



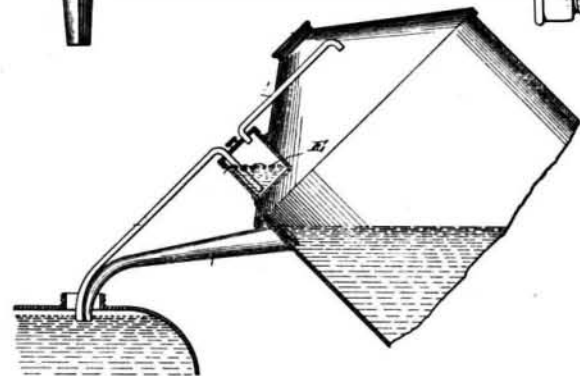
W. H. MCCOY'S ANGLE BORER.



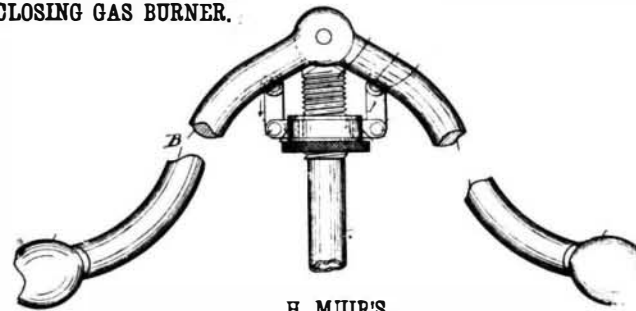
W. H. BURLAND'S GUMMING APPARATUS.



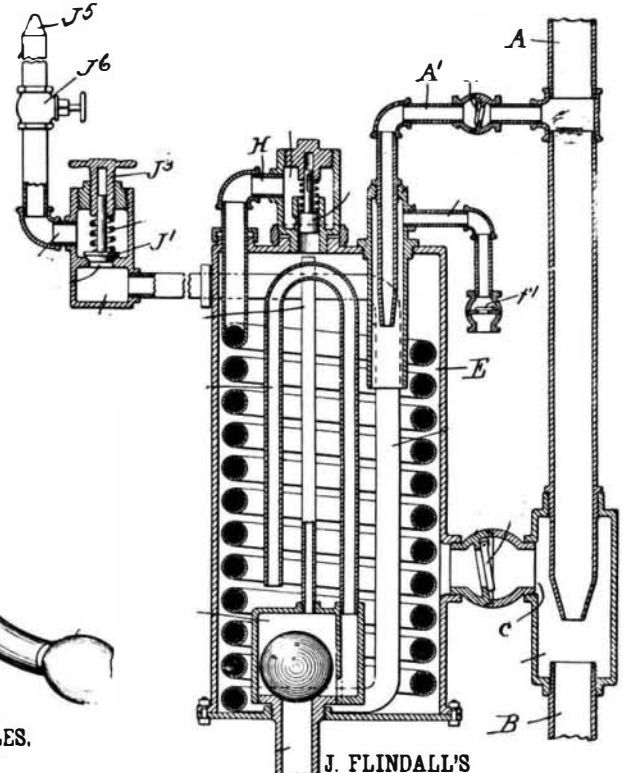
F. P. BARNEY'S SELF CLOSING GAS BURNER.



W. BELL'S OIL CAN.



H. MUIR'S ADJUSTABLE HANDLE BAR FOR BICYCLES.



J. FLINDALL'S AIR COMPRESSING AND COOLING APPARATUS.

**SOME RECENTLY PATENTED INVENTIONS.**

paper read before the Technical Society of San Francisco by James E. Schuyler, C. E.

**The Knapp Roller Boat Launched.**

The roller steamer designed by Lawyer Knapp, of Napanee, was successfully launched at Toronto, September 8. The vessel is cylindrical, 110 feet long and 25 feet in diameter, and has a 60 horse power engine at each end. It is made of three-eighths inch boiler plate, and has an inner and outer casing with watertight space between them. The engines are expected to drive the outer cylinder rapidly around and make it roll over the water, the inventor looking for a speed of at least forty miles an hour.

a very high vacuum by simply raising and lowering the vessel of mercury.

Each manipulation of the vessel, g<sup>1</sup>, up and down will exhaust from the lamp bulbs and the ring, e<sup>2</sup>, ninety-nine one-hundredths of what remains of the gas at the beginning of each manipulation, leaving only one one-hundredth behind. Thus, if the first manipulation, when the air was driven out from the vessel, k<sup>2</sup>, be not considered, the remaining quantity of gas in the bulbs and ring, e<sup>2</sup>, after the first effective manipulation of the vessel, g<sup>1</sup>, in the manner described will be one one-hundredth of the original quantity of gas. After the second manipulation the residue will be one one-hundredth of what remained after the first manipulation,

vided with a serrated sector which is capable of being clamped in any desired position by a follower placed in the side of the seat post and pressed by a lever screw.

This device permits of adapting the saddle to different persons, and it permits the same rider to vary his position from time to time.

**COMBINED STEAM ENGINE AND BOILER.**—We give a sectional view of a new form of steam engine patented by W. Schmidt, of Ballenstadt, Germany.

This invention relates to steam boilers and engines in which the cylinder of the engine is either partly or wholly arranged in the boiler. There are combined steam engines and boilers in which the cylinder is ar-

ranged within the steam space of the boiler, and there are other combined steam boilers and engines in which the cylinder is arranged within the steam of the hot gases issuing from the boiler furnace. Neither of these arrangements have met with the desired success.

The purpose of this invention is to overcome the defects of the former devices, and to produce a combined steam boiler and engine that is able to yield a high useful effect, that requires repairs at very long intervals and does not need continual attention. These advantages are attained by arranging the cylinder of the engine within the interior of the boiler, with the lower end projecting into the firebox. The cylinder serves as a stay to the crown sheet. The engine is single acting and the valve is placed in the steam and water room of the boiler. In addition to the heating surface furnished by the firebox, a number of drop tubes are provided which add greatly to the steam generating capacity of the boiler.

**ANGLE BORER.**—This instrument is used in connection with a bit brace for boring holes at an angle with the angle of the brace.

The shaft, *f*, which fits the bit brace passes through a sleeve, *A*, having an arm, *a*, to which is adjustably clamped a rod, *c*, jointed at one end to the sleeve, *B*, and in which is journaled the shank of the chuck, *C*. The shank of the chuck, *C*, is connected by a universal joint, *D*, with the shaft, *f*. The chuck, *C*, receives the shank of any bit.

This device is the invention of William H. McCoy, of Miller's Falls, Mass.

**GUMMING APPARATUS.**—One of the figures in the engraving shows an apparatus designed for applying gum to labels. The gum being contained in a bottle which forms the font, the gum is held in the bottle by atmospheric pressure and is let down into the trough as it is used. The body of the device is furnished with a holder for the mucilage brush; also with a scraper.

To apply a bottle of mucilage to gumming apparatus, it is only necessary to perforate the cork and slip it over the nipple at the top. A small vent hole is made in the stopper, which may be brought into connection with the vent formed in the top of the device when it is required to return the mucilage to the bottle. When the vents are adjusted so as to admit air to the bottle, the trough of the apparatus may be turned so as to cause the gum to flow back into the bottle, when the bottle may be removed and corked for future use.

This invention has been patented by W. H. Burland, of Punta Gorda, Fla.

**BRAZING APPARATUS.**—We give an engraving of a blast lamp for brazing, soldering, etc., embodying several improvements which render it economical and efficient.

A closed tank contains a liquid fuel, such as gasoline; also air under pressure. A coiled pipe extends from the bottom of the tank to the burner, and is closed by a screw valve, *D'*, which serves to regulate the flow of vapor to the combustion tube, *D<sup>2</sup>*. The latter is perforated, and has upon its inner and outer ends forks for supporting a soldering iron. Below the burner there is a cup, *D*, which surrounds the tube and is designed to contain a small quantity of gasoline for the preliminary heating of the burner. A pump, *E*, which also forms the handle of the lamp, is employed to create the initial pressure necessary to force the gasoline up to the burner. The bottom of the lamp is made funnel-shaped for convenience in filling, and is provided with a screw plug through which the gasoline is introduced.

This apparatus is the invention of John C. Dupee, of Chicago, Ill.

**ELECTRO-PNEUMATIC CIRCUIT CLOSER.**—This invention relates to pneumatic dispatch or transmitting apparatus employing a column of air which fills a conduit wherein a carrier or series of carriers are propelled by the air pressure as the motive force, and the improvements relate to a circuit-closing device operated by variations of pressure taking place in the air column as the carrier passes.

This invention provides means for indicating the passage of the carrier by any fixed point. The invention is especially designed for closing an electric circuit which locks the sending apparatus at the next station on the line of a pneumatic dispatch system, or it may be used to indicate at some distant place that a carrier has passed a given point. This will be of use in determining the velocity of carriers in the tube, or in showing whether or not a second carrier should be introduced into the tube. The dispatch tube is connected by small tubes with the diaphragm cell provided with a diaphragm carrying an electrical contact held normally away from an insulated contact screw supported in the wall of the cell. When the carrier, *C*, moves in the direction shown by the arrow past the tube, *b*, the excess of pressure at *a* will be transmitted to the diaphragm, causing an electrical contact and thus producing a signal on the bell connected in the circuit. When the carrier passes the second tube, equilibrium is restored and electrical contact is broken.

This device is the invention of B. C. Batcheller, of Brooklyn, N. Y.

**OIL CAN.**—The engraving shows an oil can designed for filling the fountains of oil lamps. The can is provided with an attachment which stops the flow of oil when the fountain is full; it also admits of seeing the oil in the font. The oil can is provided with a spout of the usual description, and to the top of the can is attached a small auxiliary reservoir, *E*, containing a liquid. A tube of small caliber dips in the liquid in the small reservoir and extends over the tip of the spout, as shown. Another small tube extends from the top of the small reservoir through the top of the can into the air space. So long as the oil in the font is below the can nozzle, air enters the smaller tube, and bubbling up through the liquid in the small reservoir, supplies the air space of the can so as to allow the oil to flow out; but as soon as the oil in the font covers the mouth of the small tube, air can no longer enter the can, and the oil is prevented from flowing by atmospheric pressure.

This invention is patented by William Bell, of Bay Side, N. Y.

**SELF-CLOSING GAS BURNER.**—In the use of coal gas for lighting purposes the extinguishing of a light without the careful closing of the gas supply to the burner is a constant and alarming cause of danger. Many gas fixtures exist in which the valve has not the proper stops. Such cocks or valves are liable to be turned so as to extinguish the light and turned enough farther to permit the gas to escape. Many lives are annually lost by asphyxiation from self-illuminating gas, and often attributed to self-destruction when the fault was with the gas fixtures. Pure coal gas, formerly used, by its offensive odor gave at least notice of its escape; but natural gas and the modern water gas, while more deadly, give no warning of their presence.

Mr. Frank P. Barney, of Chartley, Mass., has patented a device which is designed to prevent the possibility of the escape of gas from a burner after the light has been extinguished. The engraving shows two forms of device for this purpose. In one of these the valve is inclosed in the burner tube, which is opened by expansion of the rod, *8'*, when the rod is heated, and which is closed when the rod is cooled. In the other form the stress of the cold wire, *8'*, holds the valve closed, and the expansion of the wire when heated permits the valve to be opened automatically by the spring.

The operation of this burner is as follows: The rod, *8'*, which extends through a hole in the center of the yoke, is adjusted by the thumb nut, *9*, to hold the valve disk to the valve seat, so as to prevent any gas passing to the burner. When so adjusted, the rod is firmly clamped by a clamp screw. By holding a taper or a match against the rod, *8*, the rod quickly expands, the valve is partially opened, the gas ignited, and as the rod, *8*, expands, the flame burns bright. When now the gas is turned off to extinguish the flame, or the flame is otherwise extinguished while the gas is turned on, the rush of gas and the absence of the heat of the flame cause the rod to cool quickly and contract, thereby closing the valve and preventing the escape of gas.

**ADJUSTABLE HANDLE BAR FOR BICYCLES.**—Many attempts have been made to produce a handle bar for bicycles which could be quickly adjusted, and which would retain its adjustment without danger of alteration even under heavy strain. H. Muir, of Chicago, Ill., has invented a handle bar which seems to fulfill these requirements.

This device, which is shown in one of the illustrations, has the halves of the handle bar pivoted to the handle bar post, the upper end of the latter being threaded to receive a nut having a circumferential groove and a milled flange. In the groove is placed a collar, which at diametrically opposite sides is connected by means of links with the two parts of the handle bar. By turning the nut, the ends of the handle bar are moved up and down as occasion requires.

**AIR COMPRESSING AND COOLING APPARATUS.**—John Flindall, of Chicago, Ill., has recently patented an apparatus for cooling and compressing air.

It provides a simple and cheap means of refrigeration, by utilizing the water of the house supply, which automatically compresses and cools air, which by subsequent expansion absorbs heat and produces the temperature desired.

For a full description of this invention, the reader is referred to Mr. Flindall's patent.

**THE History of the Cross Hairs in Transits, etc., is discussed by E. Hammer in the Zeitschrift für Vermessungswesen for 1896, says Engineering News. He credits William Gascoigne, of England, with the first use of hairs for this purpose, in 1640, or a little earlier. Gascoigne fell at the battle of Marston Moor in 1644. He speaks of only hair and thread. In 1662 Malvasia employed, besides hair and vegetable fiber, silver wires. In the middle of the last century, glass and mica plates, with engraved lines, were employed in place of cross hairs; as described by Brander in 1772, and used by Breithaupt in 1780. Spider webs were not thought of until 1775, when their use was advocated by Fontana. In 1818 Struve employed fine glass threads, and platinum wire has been substituted in recent years.**

#### Science Notes.

If the Roentgen rays come into general use for customs examinations, the dry plates of the amateur photographer will be ruined.

Mr. Hiram S. Maxim was the first man to pay a fare for the use of an electrical cab when they began running in London a short time ago.

The members of the Bryant Mount St. Elias exploring expedition report a failure as far as scientific results were concerned, but they brought back samples of good looking copper ore picked up along the Alaskan coast and report the discovery of ledges of considerable magnitude.

The trustees of the Boston Public Library will publish an exhaustive "Bibliography of Anthropology and Ethnology of Europe." It was prepared by W. Z. Ripley, of the Massachusetts Institute of Technology. The list of references cited includes 1,500 titles taken from original sources. There will also be references to original maps.

From Science we learn that the United States Geological Survey has appropriations for the present fiscal year as follows: The topographical surveys \$175,000; for geological surveys and researches, \$100,000; for investigation of coal and gold in Alaska, \$5,000; paleontology, \$10,000; chemistry, \$7,000; gaging streams and water supply, \$50,000; mineral resources, \$20,000. Besides these are allowances for illustrations, printing, etc. The same bill also appropriates large sums for other surveys of the public forest lands, Indian Territory, etc.

The barkentine Maggie arrived at North Sydney on August 31, from Nachook, Labrador, bringing news of the Dominion government's Hudson Bay expedition steamer Diana, which left Halifax last May. She is in the north to determine if the waters of Hudson Bay may be navigable for grain steamers during the summer months. On July 15 the Diana was nipped in the ice near Fox Channel, when her rudder was carried away and the port side was badly strained. Repairs were effected, and on August 13 she continued her voyage for Cumberland and Fort Churchill in Hudson Bay.

In order to ascertain whether it is possible for a human body to become completely dissolved by submerging it in a solution of crude potash, an experiment was tried a short time ago at the Rush Medical College, Chicago, Ill., in the interest of the district attorney, who wished to convict of murder a man who was accused of killing his wife and making away with her body by subjecting it to the action of potash. The experiment showed that although the cadaver remained in the bath for a considerable length of time, nothing remained but a few bits of bone, which presumably would also have become dissolved if allowed to remain longer.

Additional information concerning the use of acetylene is furnished in the simple method devised by A. E. Murphy, of Essex, England, for blowpipe work and in atmospheric burners, and communicated by him to Nature. An ordinary Bunsen burner of special dimensions is employed, with a very small jet for the gas—this for the laboratory—and the burner tube is covered with a cap to exclude dust when the burner is not in use. The acetylene is generated under about seven or eight inches water pressure; with six inches pressure a perfectly clean flame of good size can be obtained, the flame burning steadily and noiselessly, with a consumption of about one cubic foot of the gas per hour. The flames are found to be possessed of great heating power, one volume of acetylene being for practical purposes nearly twice as effective as one volume of ordinary gas. This, it is declared, means an immense saving of time in all heating operations, and in many cases the use of a blowpipe can be dispensed with, the burner alone being quite hot enough for small fusions and simple glass making operations.

An important subject about which very little experimental information is on record is that of the supporting power of soils, but recently the city engineer of Vienna has taken up the investigation and designed an instrument for exact measurement, and also a practical apparatus for the use of builders and bridge builders, says the Railway Review. He has ascertained that up to a certain limit the depth to which a given loaded area sinks is directly proportional to the load which it bears, and this limit should in no case be exceeded. His apparatus consists of a base plate and cylinder into which a plunger is fitted and upon which weight can be placed corresponding successively to uniform pressure per unit of area. The corresponding sinking of the plunger into soil is then very precisely measured by a micrometer upon a multiplying column. For practical use of builders this apparatus is replaced by a rod carrying a divided head, upon which a tube containing a spiral spring is fitted. The end of the rod is provided with a number of tips of various determined areas, in order that one adapted to the nature of the soil may be selected, and, by pressing this on various portions of the ground to be tested and taking readings from the spring scale, the relation between the pressure and the penetration may be obtained.