

**The Canadian Canal System.**

The Canadian canal system now comprises the following sections: First, the Welland Canal from Lake Erie to Lake Ontario. Thence the route is across Lake Ontario itself to Kingston, where the navigation of the river St. Lawrence begins. As is well known, remarks a *Herald* correspondent, sent especially to study the Canadian canals, this river along its upper portion, owing to numerous rapids, is unfit for continuous navigation. Hence at various points these rapids are avoided by canals, the vessels passing back from them to the river. These are the Galop Canal, the Rapide Plat Canal, the Farran's Point Canal, the Cornwall Canal, the Beauharnais Canal, and the Lachine Canal, where the river is reached at Montreal, and ocean navigation begins. When it is remembered that the Erie Canal is 350 miles long to Albany, and has 72 locks, a table showing the superiority of the Canadian route in the matter of plain sailing will be instructive, since with 365 1/4 miles it reaches ocean navigation:

	Canal Navigation. Miles.	Free Navigation. Miles.
Welland Canal.....	27	—
Lake Ontario.....	—	160
River St. Lawrence.....	—	66 1/2
Galop Canal.....	7 3/4	—
River St. Lawrence.....	—	4 1/2
Rapide Plat Canal.....	4	—
River St. Lawrence.....	—	10 1/2
Farran's Point Canal.....	3/4	—
River St. Lawrence.....	—	5
Cornwall Canal.....	11 1/2	—
Lake St. Francis.....	—	32 3/4
Beauharnais Canal.....	11 3/4	—
Lake St. Louis.....	—	15 1/4
Lachine Canal.....	8 1/2	—
Totals.....	70 1/2	294 1/2

From Lake Erie to Montreal, 365 1/4 miles.

This route has only 54 locks. It can accommodate vessels of nearly three times the tonnage of those on the Erie Canal. It can remain open to navigation about the same length of time. It has 9 feet of water in the lowest of its locks, against 6 feet in those of the Erie Canal. This refers to the Canadian water route as it is.

As the Canadian water route is intended to be these already superior conditions will be greatly increased. To begin, the minimum size of the locks is to be 270 feet by 45 feet, with 14 feet of water on the miter sills. The enlargement of the Welland Canal will shorten the distance one mile, with one lock less besides. At the Galop Rapids it is proposed by submarine operations to lower the bed of the river from 10 feet to 16 feet, so that vessels descending need not pass through the Galop Canal at all. A contract has been issued for this work. The entire system of river and canal navigation is to be made available for vessels drawing 14 feet, dredging in the former case being necessary. No clear sketch of the work has been completed yet, and all the prospective benefits remain therefore unrealized.

**NEW SPORTING GUN.**

Until quite recently guns of the class shown in our engravings were imported, but we are now able to produce on this side of the Atlantic guns that are not only fully equal to the best English make, but also a great deal cheaper.

The gun shown in our engravings is unquestionably one of the best breech-loading sporting guns in market. It is manufactured at Colt's armory by the best and finest machinery, and is as good a specimen of mechanical work as one would wish to see. The parts are interchangeable, and so accurately made that parts of different guns may be intermixed and a gun may be put together from parts taken haphazard. The lock is of the rebounding style, and the firing pins are without springs. The entire mechanism is exceedingly simple, yet each part performs its office perfectly.

The action bolt, A, which retains the barrel in its place, is moved by a lever, B, through the medium of internal parts not shown in the engraving. This bolt engages two hooks on the barrels and retains the barrels rigidly in place.

The bolt, C, carrying the shell extractors is engaged by a cam, D, on the bolt, connecting the stock and the barrel, and when the barrel is released by drawing the action bolt, A, and tipped as shown in Fig. 1, the shell extractor is operated.

The stocks to these guns are made of any desired style of English or Circassian walnut or other choice wood, and the guns can be furnished with any grade of finish. Patterns are furnished with the guns if desired, and the guns are guaranteed to make the pattern furnished. Each gun is thoroughly tested at the factory, and none but absolutely perfect ones are placed on sale.

We have recently examined samples of these fine guns from the establishment of Messrs. Hodgkins & Haigh, 300 Broadway, New York city, who keep an assortment of them on exhibition and for sale.

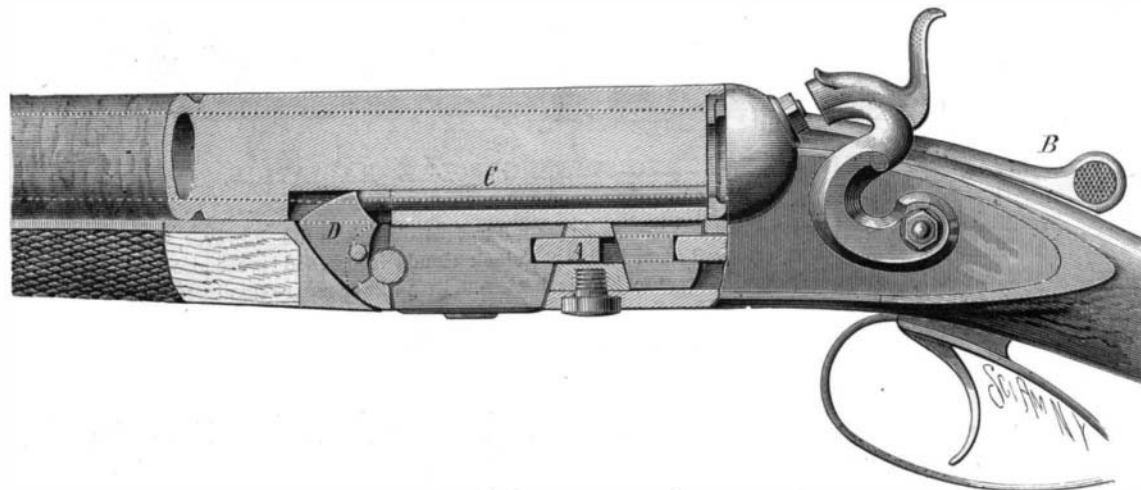
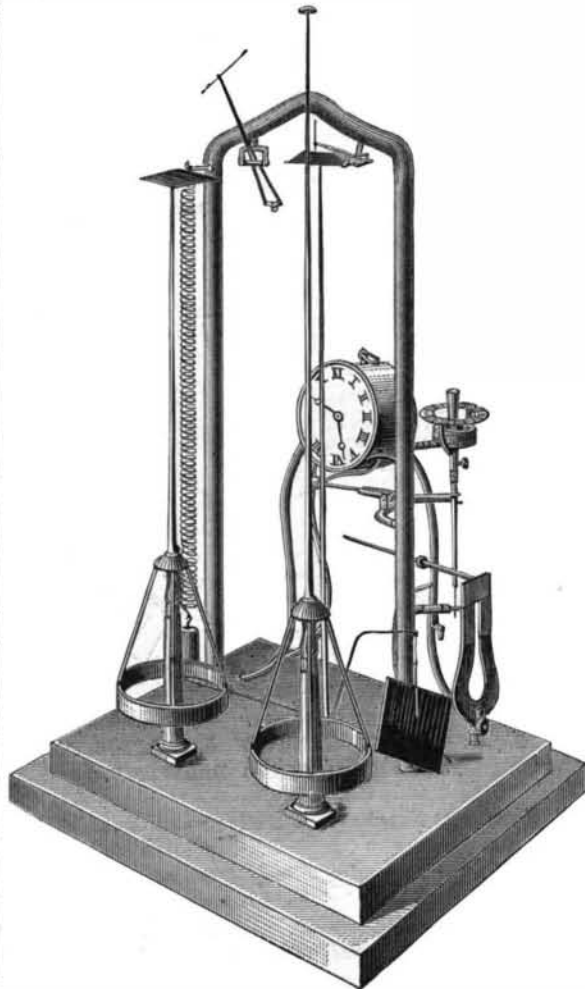


FIG. 1.—COLT'S DOUBLE BARRELED BREECH-LOADING SPORTING GUN

**APPARATUS FOR RECORDING EARTHQUAKE MOVEMENTS.**

The accompanying cut, taken from *La Nature*, represents an ingenious seismograph invented by M. Ignazio Galli, of the Meteorological Observatory at Velletri, Italy. It con-



GALLI'S SEISMOGRAPH.

sists of six separate devices for observing and recording automatically the horizontal and vertical amplitude of earth tremors, the direction of the earthquake movement, the time of the shock, and the intensity of the attending magnetic disturbance. At the nearest corner of the marble base is a short standard of metal, on the top of which rests an agate cap, balanced by a metal ring below, and carrying above a long, slender vertical rod, the whole forming a sensitive pendulum. At the top of the rod is a small silver

that the vertical rod is shorter and carries at top a sheet of paper covered with lampblack. Resting on this blackened paper is the fine needle of a nicely balanced lever attached to the brass support which arches over the middle of the base. As the earth tremor causes the paper to move the relative extent and character of the movement are marked by the needle on its blackened surface. Behind this part of the apparatus is a weight suspended by a sensitive spiral spring. At the bottom of the weight is a lever, to the other end of which a needle is suspended by a hair, the point of the needle resting on a sheet of blackened paper slightly inclined. This is for measuring the vertical height of the earth movement. Its operation is obvious.

The direction of the movement is marked by the needle of the lever attached near the upper right hand corner of the frame, on the sheet of blackened paper on the top of the rod which rises from the middle of the base.

To ascertain the quarter whence the movement proceeds and the time of the shock, a truncated metal cone is inverted and balanced on a horizontal metal disk surrounded by a ring marked with the cardinal points. The instant the apparatus is moved the cone tips against that side of the ring whence the motion proceeds, and in falling acts upon a lever which stops the clock, thus indicating at once the direction of the source of the shock and the time of its occurrence. The intensity of the accompanying magnetic disturbance is measured by the magnet and its attachments. This seismograph is inclosed in a glass case, is small, extremely sensitive, and records the slightest tremors of the earth with great precision.

**MISCELLANEOUS INVENTIONS.**

An easel for holding drawing boards and other similar articles, which is so arranged that the board or other article can be set in a horizontal position or at any desired inclination, and can also be revolved so as to present the drawing or other object in different positions for the purpose of facilitating the work on the object, has been patented by Mr. Isaac Wilkins, Jr., of Greenpoint, N. Y.

An improved scarf, which can easily be changed so that either end of it may be attached to the neck band, has been patented by Mr. Werner W. Fichtenberg, of New York city. Both ends of the scarf are alike, and provided with a neck band having its end fastened to a small plate, which is pivoted to a button that is arranged to slide on a thin rod or a wire fastened to the rear side of the scarf.

Mr. John T. Rossetti, of Brownsville, Texas, has patented a pendant for a watch which can be turned in every direction and can be screwed into the watch case. The pendants made heretofore could be turned forward and backward in one direction only, and were not screwed into the case, but soldered to it, and were liable to break off.

Mr. Samuel M. Rhoads, of Jeffersonville, Pa., has patented a simple and durable shaft or pole coupling for vehicles. The invention consists in combining with the cushion of a thill coupling a box having a recess and back piece, a separate axle clip, and a screw-threaded cap having ears that clasp the box.

An improved corset clasp, patented by Mr. William McCabe, of New York city, consists in forming the hook plate with a spring tongue to prevent the accidental separation of the hooks and eyes after they have been fastened.

Mr. Charles H. O'Connor, of Brooklyn, N. Y., has patented a process for the manufacture of flexible non-inflammable paper, or for the treatment of paper to render it non-inflammable; that is to say, saturating paper wholly or partially unsized with a solution of silicate of soda of low specific gravity, and subsequently drying the paper.

Mr. John B. Weir, of Otsego Lake, Mich., has patented an improved calk plate for boots and shoes which is both simple and effective. It consists of a metal plate covering the heel and sole, provided with calks on the lower side and lugs, which fit into corresponding recesses in the sole on the upper side. It is secured to the heel of the boot or shoe by means of a countersunk screw, which takes in a threaded plate and socket in the heel.

Mr. Thomas B. Baldwin, of Troy, Pa., has patented a parlor cooking stove with two fireplaces, so arranged that the one may be used simply for heating purposes, and the other be used simply for cooking purposes.

Mr. Robert Cunningham, of Brooklyn, N. Y., has patented an improved process of ornamentation, consisting in fixing the ornament in the desired position with some suitable adhesive substance or fastening, and then pouring over the entire surface of the ornament and its support a sufficient quantity of transparent alcohol copal varnish to cover and imbed the ornament.