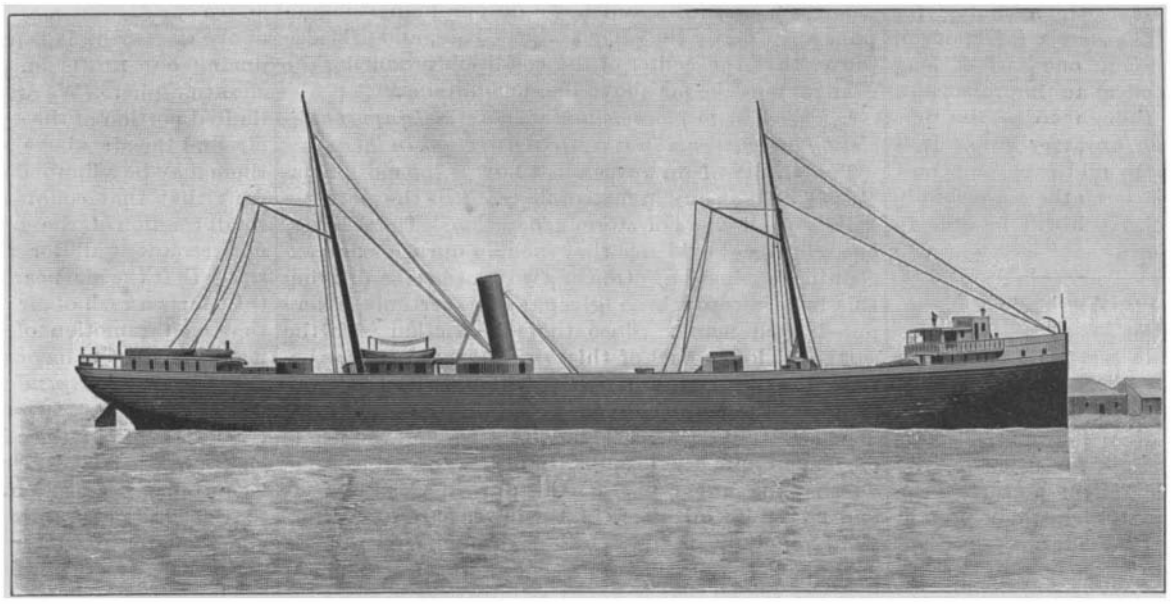
### LAKE STEAMERS BUILT BY A CLEVELAND FIRM.

During the past nine months the Globe Iron Works Company, of Cleveland, O., has been building steel steamers of the class shown in our illustration, for the freight business on the great lakes on our Northern border, at the rate of about one steamer a month. This business will compare favorably with that of any other shipbuilding firm in the world, being exceeded, probably, in only one or two instances, for these steamers have a carrying capacity of about 3,000 tons each. The vessel shown is of the same style as eight others built during the present year, and has a length of keel of 296 feet; length, over all, 312 feet; beam, 40 feet; moulded depth, 24 feet 7 inches; draught, 15 feet 6 inches. Her engines are triple expansion, with cylinders 24, 38, and 61 inches in diameter respectively, and with a 42 inch stroke. She has an independent air pump condenser. Her wheel is sectional and 14 feet in diameter, with a lead of 17 feet. She has two boilers of the Scotch type, each 14 feet in diameter and 12 feet 6 inches long, with three furnaces, the boilers being designed to carry 160 pounds pressure. She has eight loading and two fueling hatches, with steam windlass and capstan forward, steam capstain aft, and steam steering apparatus. Like all the other boats of this class, she does not carry any canvas.



A REPRESENTATIVE FREIGHT STEAMER ON THE GREAT LAKES.

The tonnage of vessels built upon the great lakes has shown a remarkable increase within the past two or three years, and there are striking indications that the growth will be even more pronounced in the next two or three years. As reported by the Bureau of Statistics of the U. S. Treasury, the tonnage built on our Northern lakes for the fiscal year to July 1, 1889, was 107,080, while for the fiscal year 1887 it was but 56,488. The vessels built on the Mississippi River and its tributaries for the year to July 1, 1889, foot up, by the same authority, to 12,202 tons, those built on the New England coast to a tonnage of 39,983, while the entire seaboard, Atlantic and Pacific, contribute a tonnage of 111,852, or an amount very slightly in excess of the tonnage put afloat on the great lakes. The largest amount of tonnage ever built in any one year on our entire seaboard was 310,421, in 1864. In that year there was built on the great lakes 49,151 tons, and the total was 415,741 tons, against a total of 231,134 tons the past year.

### Proposed Tunnel between Ireland and Scotland.

A public meeting, convened by the mayor of Belfast, has been held to consider a scheme for constructing a tunnel between Ireland and Scotland. Mr. Barton, civil engineer, submitted his scheme, which is to construct a tunnel from the junction of the Belfast and Northern Counties Railway, four miles inland from Whitehaven, on the Antrim coast, to the center of Wierston Hill, in Wigtonshire, also about four miles inland, the whole length to be about 34 miles. The scheme has the support of Sir Douglas Fox, engineer of the Severn Tunnel, Sir Benjamin Baker, the Forth Bridge engineer, and Sir John Hawkshaw, of London. He estimated the total cost at £8,000,000, and the tunnel could be completed in ten or twelve years. The meeting passed resolutions recognizing the importance of the scheme, urging the government to render financial assistance, and appointing a committee to consider and report upon the whole question.

### How Time is Distributed by Telegraph.

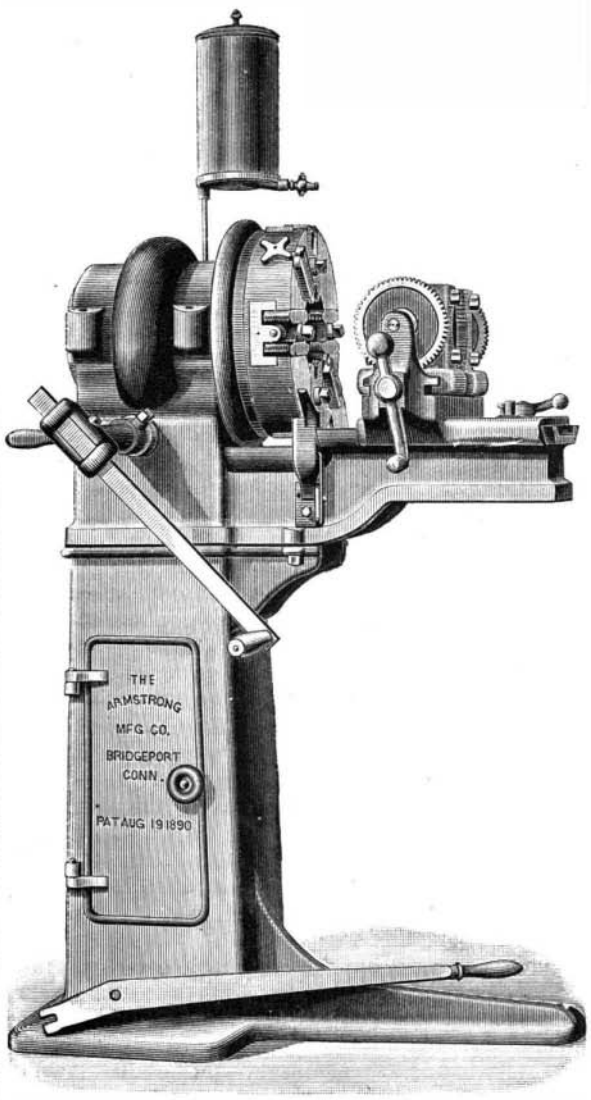
The Naval Observatory at Washington considers it an important part of its business to determine and give away to any one who chooses to ask for it absolutely correct time at noon each day. Experts paid by Uncle Sam make the computations and press the button at precisely 12 o'clock, thus communicating the hour to the various departments in this city. The Western Union is permitted to have its instruments in the room whence the message is sent, with an attachment to the button, so that the news is flashed directly from the observatory without even the aid of an operator all over the United States, reaching even so distant a point as San Francisco within the space of not more than one-fifth of a second. For such is the utmost twinkling required for the passage of an electric spark through 3,000 miles of wire.

To accomplish this the telegraph company is obliged to take all other business off the wires each day just before 12 o'clock. Three minutes and a half before noon arrives operators in all parts of the country cease sending or receiving messages and devote their attention to attaching wires in such a manner as to establish unbroken connection from Washington with points in every section of the Union to which the lines extend their ramifications. A dozen seconds before the time bell is to strike a few warning ticks come flashing along, and at the very moment when the sun passes over the seventy-fifth meridian a current gives a single throb from Maine to Florida and from the Atlantic to the Pacific, informing an expectant nation of the time of day.

Now the way in which the telegraph company makes money by distributing the time in this manner is by selling it to people all over the United States who have clocks and find it of importance to keep them right. In this manner it keeps corrected by electricity to absolute solar time no less than 7,000 clocks in the city of New York alone. All that the company is obliged to pay is the cost of maintaining its instruments at the observatory and the wires connecting these instruments with the main office in Washington. But it must be remembered that the cost of stopping telegraphic operations for four minutes in the busiest part of each day throughout the entire country is not inconsiderable.—*Com. Gazette, Pittsburg.*

### A MACHINE FOR THREADING AND CUTTING OFF PIPES, ETC.

The illustration represents a recently perfected machine, patented by Mr. Arthur W. Cash, which presents many novel features, and is designed to perform accurately and rapidly a wide range of work in threading and cutting off pipe, shafting, etc., while being simple and durable in its parts, and capable of being operated either by hand or power. The machine proper is supported upon a suitable pedestal, and the base has a hollow upward projection in which is a cavity for the reception of oil or other lubricant, and in which is journaled a hollow tool-carrying shaft, with a change speed gearing, the arrangement permitting of the use of a large quantity of oil, so that the gears may run submerged, and be tightly inclosed, to prevent the entrance of dirt or chips. Motion is communicated by means of a transversely arranged primary shaft having on one end a pulley and on the other end a crank. Upon the forward end of the hollow shaft is a circular head in which the dies and cutting-off tools are mounted, the dies being secured upon die blocks radially movable in the head, while the face of the head bears gauge marks by which the standard marks upon the dies may be set. Behind each of the die blocks is a short shaft journaled in the head, each shaft having an eccentric wrist projecting into the die block, and its inner end carrying a small gear. Toothed sections in the periphery of a ring mesh with these gears, and immediately at the rear of the ring is a hand wheel, which, with the ring, gear, and eccentrically placed wrists, imparts radial movement to the die blocks and dies in the head, to project the dies inward to operate upon the end of a pipe or bar, or withdraw them, leaving the center of the hollow shaft clear for new work.




A PIPE-THREADING AND CUTTING-OFF MACHINE.

The cutting-off mechanism consists of small carriages arranged opposite each other in the head between the die blocks, each of the carriages having an adjustable tool, and being moved inward or outward as desired by feeding screws. The threading dies and cutting-off tools are so arranged as to prevent any possible damage to work by their simultaneous operation, the dies when at work projecting into the field of the cutting tools, and the latter, when in operative position, preventing the engagement of the dies with the work.

A vise, whose base is adapted to slide upon ways on the end of the bed, as shown at the right in the engraving, presents the work to the tools, so the work is rigidly held against all movement for the cutting-off operation, or is held against rotation and given an inward feeding movement for the operation of the screw-cutting dies. The power is applied directly at the rear of the vise jaws, so that the end thrust of the screw is borne by the standard instead of by any part of the machine out of line with the jaws. In cutting threads, the work is forced into engagement with the dies by means of a transversely extending lever fulcrumed on the vise base, and is there held until the threading is completed, when, instead of reversing the machine or imparting movement to the work, the latter may be disengaged by turning the hand wheel operating the die blocks. In the work of cutting off, after adjustment, the tools are operated into initial engagement, when a movable trip engages the arms of small feed wheels, feeding the cutting tools inward intermittently at either of two speeds until the pipe is severed. The hollow tool-carrying shaft being open at both ends, pipe of any length may be operated upon.

This machine is manufactured by the Armstrong Manufacturing Co., Bridgeport, Conn.

### Luminous Paint.

We have before spoken of the new German manufacture of luminous paint, by which oil or water colors, shining by night with white, red, blue or yellow, according to the variety desired, can be sold at retail at about a dollar a pound, while the price of the Balmain paint, as made and sold in England, is about nine dollars a pound.

On account of its high price, the Balmain paint has never come into extensive use. It was evidently good, but, as the expense of covering a wall with it amounted to about two dollars a square yard, it was impracticable to use it, as the manufacturers recommended, for painting the interiors of cellars, railway tunnels and other dark places, and it came at last to be used only for painting match boxes, key holes and small objects. The German luminous paint, which is sold in Berlin by Fretzdorf & Mayer, Steinmetzstrasse 15, and in Dresden by Gustav Schatte & Co., costs only about seventeen cents for enough to cover a square yard of surface, so that it would be really possible to paint a room with it, without ruinous expense. At present, a good deal of it is used in painting crucifixes and images of saints, which find a ready sale in Germany, and are exported in large quantities.—*Amer. Architect.*

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