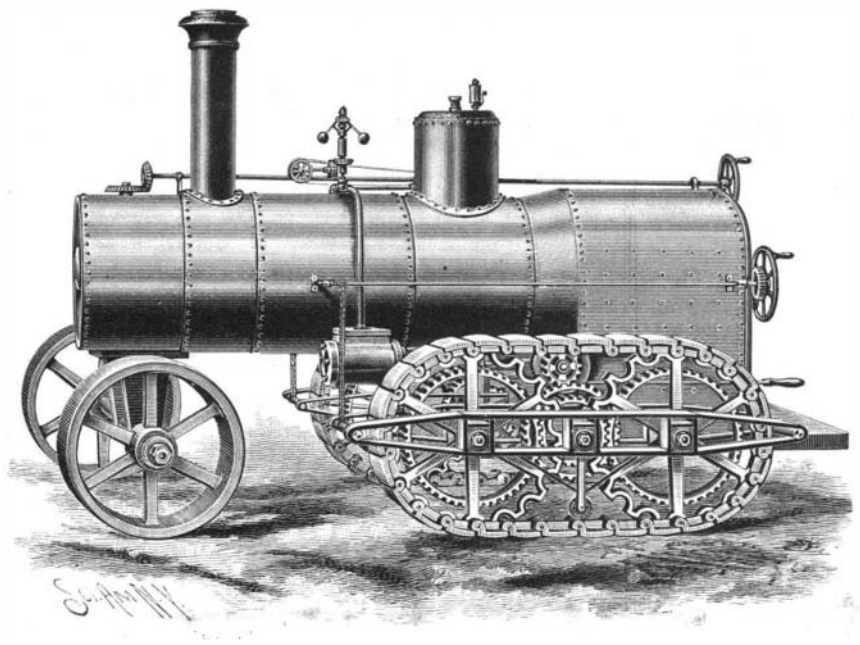
AN IMPROVED TRACTION ENGINE.

This machine is more especially designed for use on farm land, to travel readily over plowed ground, for cross plowing and other work, and is propelled by endless tracks which travel on the ground and are engaged by wheels actuated from the engine. The improvement has been patented by Mr. Charles H. Stratton, of Moscow, Pa. In front of the usual boiler and smoke box is a cold water tank, and the front end of the machine is supported by wheels upon a pivoted axle, the wheels being turned as desired for steering purposes by means of a bevel gear connection with a rearwardly extending rod actuated by a hand wheel. The rear part of the frame is supported by tracks in the form of endless chains, a rib or web across the inner side of the track sections affording a straight surface for friction rollers to work upon when the driving wheels meet with obstructions causing too great strain. The inside of each link of the tracks is segmental, and their outer surfaces have corrugations or ridges which readily embed themselves in the ground. The axles of the track-carrying wheels, and of a central shaft carrying gear wheels, are journaled in a frame adapted to oscillate to conform to any inequalities of the surface of the ground, and, to facilitate turning, the forward end of the frame may be raised by a rod and chain, the rod extending back to the platform and being operated by a hand wheel. The central shaft, by means of gears and pinions, is actuated from the engine, and communicates motion to the track-carrying wheels, whereby the machine may be propelled backward or forward, the pinions being thrown into and out of gear by a lever extending to the back platform. This machine has far greater traction surface than other machines of the kind, enabling it to travel on the softest of ground. Its track is 12 inches wide and 3 feet 6 inches long, thus affording a surface contact of 500 inches. By means of a bevel gear wheel on the crank shaft, the machine actuates a shaft, not shown in the view, but which may be utilized to drive thrashing, mowing or reaping machines, or for any other purpose for which power may be needed.



STRATTON'S TRACTION ENGINE.

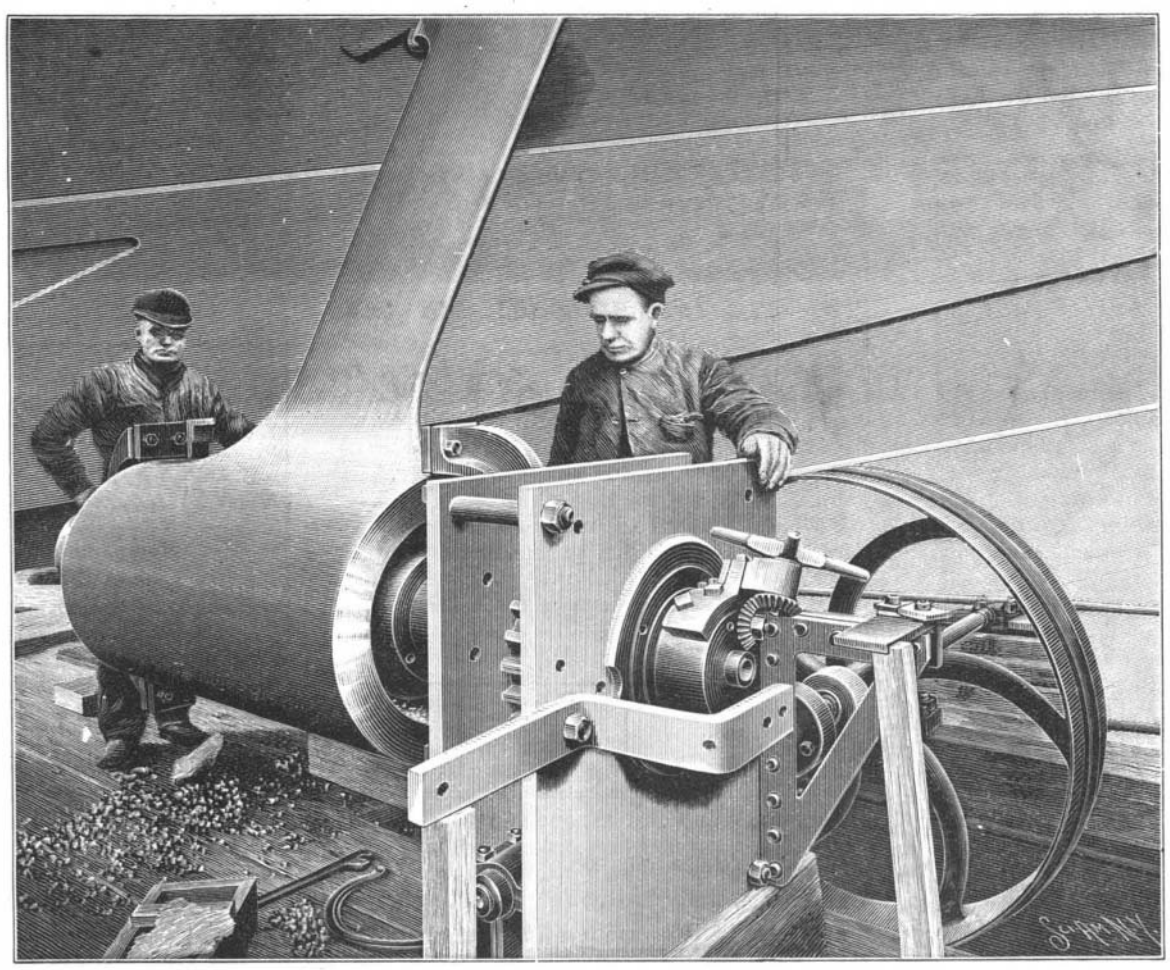
PROGRESS OF THE CRUISER MAINE.

The alignment of the outboard bearing of the twin propeller shafts on vessels of the dimensions of our armored cruisers requires to be done after the bracket is in place; owing to the fact that the bracket has to be flanged and riveted to the hull, which under the quarter has a varying surface, which makes it very difficult to fit the brackets with a precision of alignment necessary to so important a work, as the brackets have to be flanged and riveted to the steel plates of the hull. To make the alignment perfect, the bearing in the bracket head is roughly b o r e d somewhat smaller than the finished size, and when the bracket is made fast as nearly as possible in its proper place, the boring machine we illustrate is attached to the head of the bracket, adjusted in the exact line of the shaft, and the hole bored to its proper alignment.

Our engraving illustrates the mechanism and mode of boring one of the brackets of the war ship Maine, which is now being completed at the navy yard, Brooklyn, N. Y. The machine, as represented, was designed and built at the Quintard Iron Works, they being the builders of the engines and propellers of the cruiser Maine. As will be seen by inspecting the illustration, the boring bar is made hollow, to facilitate alignment.

The cutter is moved forward on the bar by a screw driven through the bevel gear seen at the rear end, turned by the spoke wheel striking the brackets at each half turn of the bar, the power being derived from a portable engine below the platform, running by steam from a donkey boiler on board of the ship.

For facing the shaft bearing a radial cutter arm was clamped upon the cutter bar, holding the cutter and fed by a radial screw and spoke wheel. This machine is but one of the ever-varying novelties constantly coming into use to suit every contingency found in making and perfecting the new forms and conditions made necessary by the ever-changing types and sizes of the great motive power machinery now being made. The Maine ranks as an armored cruiser of the first class. Her keel was laid October 11, 1888, at the Brooklyn navy yard, and she was launched November 18, 1890. Built of steel throughout. Dimensions: 324 feet length, beam 57 feet, draught 21 feet, 6 inches; displacement, 6,682 tons. Speed, 17 knots. Protective armor 180 feet long, 12 inches thick, of nickel steel. Two armored turrets. Engines, 9,000 horse power. She will carry a most formidable armament. Estimated cost, $2,500,000.



BORING THE BRACKET STAYS, OR OUTBOARD SHAFT BEARINGS, ON THE ARMORED CRUISER MAINE.

Copper on Prints.

That the salts of copper increase the resistance of coloring matters to the action of light has been known for some time, and the results of experiments with precipitated copper, the oxide, the sulphide, the sulphate, and the acetate of the metal, were communicated by M. Camille Schoen to the Mulhouse Society last year. These experiments proved that all these salts exercised the same protective action, whereas the ferrocyanide had no such effect. M. Schoen sends a further note on this subject to the society in which he records that these salts determine the formation of oxycellulose on the white parts of the fabric, but this production of oxycellulose is very feeble, except when a salt of ammonia is present. A white fabric printed with a salt of copper (the ferrocyanide excepted), mixed with a salt of ammonia and exposed to the sunlight, undergoes considerable change in the printed part as a consequence of the production of oxycellulose, but in printing with the same mixture on dyed cloth the color produced is protected and there is no alteration in the fiber. It is probable, then, that copper exercises its protective action on coloring matters by reoxidization. The salts of iron, tin, and manganese with or without the addition of an ammoniacal salt have no protective effect, says M. Schoen, noting at same time that Persoz, in his work on coloring matters, speaks of the protective action of oxide of tin on a vat blue exposed to the sun. Chloride of vanadium has analogous action to that of a salt of copper, but the effect is less strongly marked. Prud'homme has noted the oxidizing action on an ammoniacal solution of copper. It is possible that in the presence of the light there is a decomposition of the ammoniacal salt on the tissue and the formation of ammonide of copper.

Temperature North and South.

The lowest mean temperature that occurs anywhere, or at any season on the globe, occurs in January at Werkojansk, in northeastern Siberia. Here the mean for the first month in the year is —61·2°. For the same period the temperature is —40° over the region situated a little north of the magnetic pole. At Werkojansk, the thermometer has registered over 88° below zero.

Going to the other extreme, the atmosphere of the Colorado River desert has shown a maximum of 120°, and this will give a seasonal variation over the land of upward of 200° Fah., against less than one-third of that range over the water of the Atlantic. The comparative constancy of oceanic temperatures moderates the climatological conditions of approximate land masses very considerably, and the disparity between summer's heat and winter's cold is still less marked when the seaboard is swept by warm ocean currents. The mean annual temperature of the British Islands is quite 20° higher than it would be did its temperature depend upon latitude alone. This is, of course, owing to the influence of the Gulf Stream, which is calculated to pour into the North Atlantic some 38 cubic miles of warm water per hour. The heating effect of this current upon the atmosphere of the North Atlantic is best seen by comparing the position of isothermal lines with the same temperature lines in the South Atlantic. Thus, in the month of January, the isotherm of 35° runs in almost a straight line from Boston to Iceland and from Iceland across to the Norwegian coast. At its most northerly limit it just impinges upon the Arctic circle. Thus, the mean temperature of 35° is found in the coldest month at a distance of 66½° north of the equator. In the South Atlantic during the month of July, the m i d w i n t e r month, the isotherm of 35° is practically identical with the 50th parallel of latitude. Contrasting the temperatures for the midsummer months, it will be seen that while in the South Atlantic the isotherm of 50° has a mean latitude of 45°, the same isotherm in the North Atlantic passes over the middle of Iceland, and from there runs in a straight line to the North Cape of Norway in latitude 72°.—*Nautical Magazine.*

THE next meeting of the American Association for the Advancement of Science will be held at Madison, Wis., in August, 1893. It is to take place within easy distance of Chicago, during the season selected for the various scientific congresses of the Columbian Exposition. The meeting will doubtless be attended by many men of science from abroad. It is desired to make the Madison meeting a success in the matter of attendance, and more particularly as to the character of the papers presented.