

**A NEW FORGING MANDREL.**

In forging and welding sucker-rod couplings and other similar articles, consisting of two parallel or nearly parallel straps united at one end, it is customary to insert between the straps a shaping or forging mandrel, so as to secure a suitable and uniform shape and position to such straps. This mandrel is usually inserted by one workman, who forces it in endwise between the strap parts up to the point where such straps are welded together. As the mandrel is thus forced in the straps will be bent or deflected away from the stem of the mandrel, and it is necessary for another workman to grasp the straps in a pair of tongs and bend them down upon the stem, and secure them there by slipping a ring to keep over the ends, when the straps are forged to the desired shape. This operation is performed while the iron to be forged is heated and ready for working, and the delay thus incurred and the services of the helper or additional workman which are required add considerable to the expense of the finished article.

The improved mandrel is designed to overcome these objections. It consists of a mandrel stem, of suitable form, to give the desired interior shape to the straps to be forged. Near the outer end or base of this mandrel stem are secured flaring guides or wings, one on each side. These wings or guides are attached at one end only, and are arranged in line with the mandrel stem and with the flaring or free ends toward its point.

In using this mandrel the coupling, being first properly heated, is laid in such position that the workman may force the mandrel stem endwise between the straps, which he does until the point, guided by the shoulders, reaches the point where the two straps are united. In thus pushing the mandrel into place the ends of the straps come against the inside of the guides, and, sliding along the inner faces of the same, they are bent, sprung, or deflected down upon and held against the stem of the mandrel. The coupling is then manipulated in the usual way, so as to fix the straps and other parts in the desired shape. This mandrel is the invention of Mr. Alker, of Pittsburg, Pa.

**IMPROVED ICE-MAKING APPARATUS.**

One of the most promising of modern industries is the manufacture of ice. It has been the subject of a great deal of research and experiment, and the process has been cheapened so that at the present time ice forms an important article of trade.

The apparatus represented in the accompanying engraving is the invention of Mr. Daniel L. Holden, of Philadelphia, Pa.

This improvement relates to the feature of an ice machine known as the "congealer," or apparatus in which the congelation of the water is effected; more particularly to the form of congealer in which receptacles containing a cold non-congealable liquid are immersed in a tank of pure water, so as to freeze upon the outside of the receptacles blocks of ice without incorporating the impurities of the water.

The invention consists in pivoting the receptacles, C, for the non-congealable liquid at the bottom, and connecting them by flexible pipes with the main inlet and discharge pipes, so that the receptacles may be slightly rocked to one side upon their bottom pivots, to permit the easy removal of the unbroken block of ice formed between any two of the receptacles.

Provision is made for subdividing large blocks of ice, which consists in freezing flat metal blades, D, in the block, and afterward striking a blow upon the blade to divide the block at the desired point. A looped cord is frozen into the block of ice, making a permanent handle.

As the circulation of the non-congealable fluid is kept up by the pumps of the ice machine, the cold fluid, which is below the freezing point, enters each of the receptacles, C, through the flexible pipes, and passing up and down around the baffle plates in close contact with the metal walls, emerges through the pipes upon the other side. The tank, B, being filled with pure water, which surrounds the receptacles, the effect of the cold traversing currents is to freeze upon the outside of the receptacles, C, films of ice, which constantly increase in thickness until the crystallizing outer edges meet in the center and unite to form solid blocks of ice.

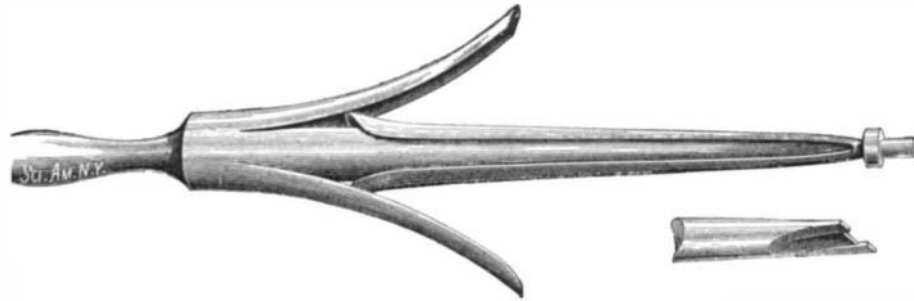
**Dissociation of Chloride of Ammonium.**

The following experiment is well adapted to class room demonstration. A little chloride of ammonium is placed in a bulb blown in the middle of a glass tube. In the ends are placed small pieces of red and blue litmus paper respectively. The bulb is now heated, while the tube is held in an oblique position, the red litmus paper being uppermost. Soon the latter will be colored blue by ammonia gas rising in the tube, while the blue paper in the lower

portion is reddened by descending vapors of muriatic acid. The degree of inclination of the tube must be found by experience, as it depends to some extent on the conditions of the atmosphere.—*Chemiker Zeitung.*

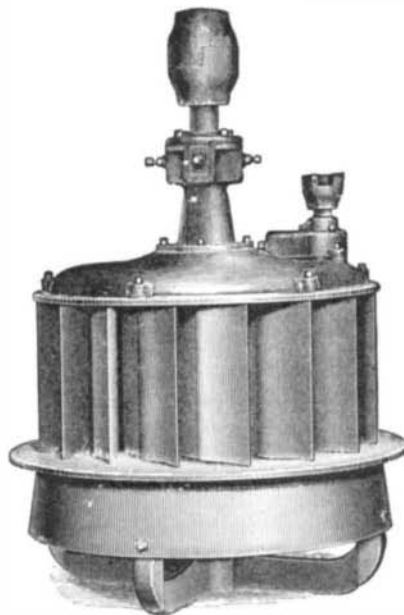
**THE VICTOR TURBINE.**

The accompanying engraving represents a turbine water wheel, which is remarkable both for its compactness and its efficiency. It is of the "inside gate register class," and has no traps, rods, bolts, or other small parts to get out of repair.

**ALKER'S FORGING MANDREL.**

This wheel is the result of careful investigations and a long series of thorough tests made by the manufacturers. No statement of its advantages can give emphasis to the results tabulated below.

	Head in Feet.	Revolutions per Minute.	Horse Power.	Cubic Feet of Water.	Useful Effect.
15 in. Victor Turbine Wheel, Tested March 26, 1878.	18.34	323	29.36	97375	8705
	18.10	321.5	29.22	97039	8808
25 in. Victor Turbine Wheel, Tested October 28, 1878.	17.80	212.5	67.61	2356.54	8533
	17.79	205.5	67.72	2362.72	8530
	17.96	209	68.62	2356.54	8584
30 in. Victor Turbine Wheel, Tested October 29, 1878.	11.65	144.5	52.54	2751.87	8676
	11.73	161	51.41	2709.94	8563
	11.66	147.5	51.96	2755.09	8564

**THE VICTOR TURBINE.**

This report needs no comment; the useful effect of 88.08 per cent is, we believe, unprecedented among recorded reliable tests of turbines. The most important feature of this wheel is its great capacity in a small diameter, admitting of a reduced first cost for a given power, and diminishing the cost of transportation.

Another advantage gained by the peculiar construction of

this wheel is that it is very economical in the use of water at part gate, and it excels in point of durability.

Further information may be obtained by addressing the manufacturers, The Stilwell & Bierce Manufacturing Company, of Dayton, O.

**Another Sub-Arctic Trade Route.**

Nordenskjöld is not alone in the development of schemes for new lines for northern commerce. What he is doing for Siberia, the Canadian Surveyor General, Colonel Dennis, wants to do for the smaller Siberia in North America. Col. Dennis proposes the establishment of an ocean trade route between Europe and the Saskatchewan valley by way of Hudson's Bay, the course being free from ice during July, August, and September. York Factory, the chief trading post on Hudson's Bay, is about the same distance from Liverpool as New York is; and it could be connected with Prince Albert on the Saskatchewan by a railroad 400 miles long.

This would bring the Saskatchewan valley as near to tide water as Ontario is to tide water at Quebec. For 200 years Hudson's Bay Company's sailing ships have traded between York Factory and Scotland. The straits and bay are clear of ice early in July, closing again at the end of September. Lignite coal is found in abundance at Davis Strait, and a coaling station for the projected steamship line could be established there. The Saskatchewan country contains 257,000,000 acres or 400,000 square miles of available agricultural land. It is watered by the Saskatchewan, Beaver, Peace, and Athabasca rivers, and innumerable smaller streams, and it is believed to be the best wheat growing region on the continent. Wheat of the finest quality grows at Fort Providence, on Great Slave Lake, on the fifty-eighth parallel, the extreme northern point of this vast territory. Colonel Dennis also points out that this scheme would lead to the development of the Hudson's Bay fisheries, and to the enormous pine-ries extending from the height of land northward of James and Hudson's Bay. He recommends that a steam vessel be fitted out during the coming season to test the practicability of the scheme.

**Small Children.**

There have been for some time on exhibition in this city two very small children. The larger, "General Mite," is described as 14 years old and weighing 9 lbs. He is well formed and a decided blonde. The smaller, Miss Lucia Zarate, is 10 years old, but weighs only 4½ lbs. She is very dark, with dark eyes and hair, her parents being Mexican.

**RECENT MECHANICAL INVENTIONS.**

A novel hub attaching device, invented by Mr. Morris L. Green, of Londonderry, Ohio, consists of a spring hook attached to the axle and a hub, chambered to receive the end of the hook.

In pumping water, especially when two pumps are employed, discharging into the same column, there is always a jar and strain at the end and commencement of the stroke as the valves shut, so that when water has to be lifted a long distance it is not safe to use a high speed pump. Mr. M. B. Brannen, of Shenandoah, Pa., has patented a relief piston for obviating this difficulty. The patent is assigned to himself and Mr. J. L. Williams, of the same place.

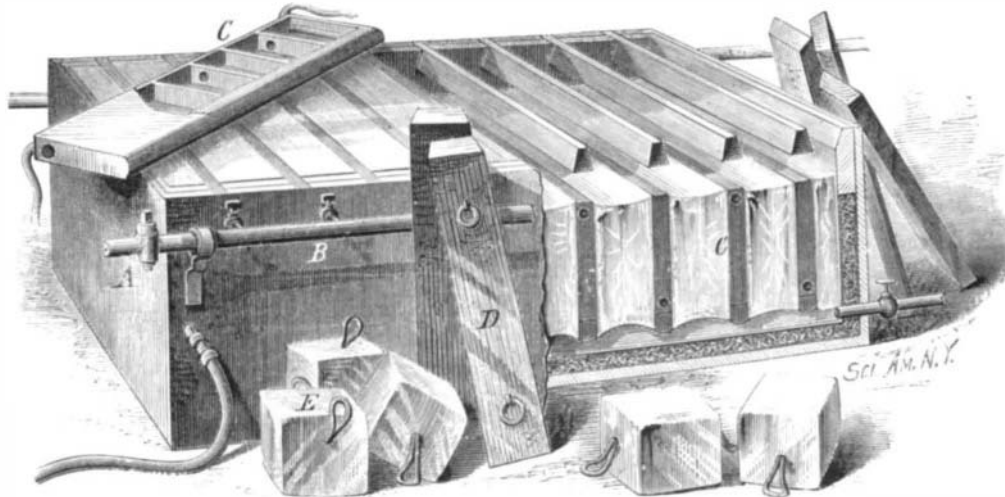
An improvement in windmills, which consists mainly in constructing the vanes or blades of sheet metal stretched between two rigid heads, has been patented by Messrs. J. T. Mider and J. T. McClelland, of Wathena, Kan. The improvement also includes a novel governor.

An improved device for transmitting motion, especially adapted to windmills, has been patented by Mr. George H. Russell, of Cheyenne, Wyoming Ter. It consists in an arrangement of two cranks placed at right angles to each other on the shaft of the wind wheel, and two connecting rods which communicate motion to two cranks on the shaft below.

An improved pendulum adjustment for clocks, patented by Mr. Geo. B. Owen, of Winsted, Conn., is arranged so that it will adjust itself readily to the position of the clock without interfering with the regularity of the pulsations.

Mr. Marvin W. Freeman, of Beatrice, Neb., has devised an improved band cutting attachment for thrashing machines, which is capable of cutting straw, cord, and wire bands with equal facility. It consists of a rotating serrated cutter revolving near a stationary serrated cutter placed on the cover of the thrashing machine cylinder.

An improvement in striking mechanism for clocks has been patented by Mr. Wm. Lindon, of Brooklyn, N. Y. In this clock the quarter hours are struck or chimed, and the striking mechanism is operated by the power that actuates the time movement.

**HOLDEN'S APPARATUS FOR MAKING ICE.**