

Arctic Climate.

BY PROF. RALPH S. TARR.

The summer of 1896 was an unusual one in respect to the amount of ice that was floating in the Arctic seas, and hence, from this, one might gain a somewhat exaggerated idea of the amount of floe ice that is generally moving southward along the American side. Yet this very exaggeration is important, since it brings out clearly the striking differences between the water conditions on the two sides of Davis Strait. The ship upon which I made my voyage encountered pieces of floe ice in the middle of July, just north of Newfoundland on the Labrador coast; and from that point until we left the American side, in latitude 65°, we were not out of sight of the sea ice that had formed during the winter in the more northern regions, and was now floating southward in the cold Arctic current which bathes this coast. Sometimes, and especially near the northern part of Labrador, and the southern portion of Baffin Land, the floe ice was so heavy that the ship was obliged to reduce her speed to half the normal amount, and then slowly push her way through the heavy cakes of ice. Sometimes it seemed as if further progress would be impossible, and so indeed it would have been had we not been supplied with a well-built whaling vessel and with steam to propel her. While off the Labrador coast we saw an excellent illustration of the importance of steam in this kind of navigation, when we passed at full speed a sailing vessel which was lying in the ice, and, being dependent entirely upon the wind, was unable to push her way through.

About the first of August an attempt was made to enter Cumberland Sound (latitude 65°) in southern Baffin Land; but the mouth of this great bay was completely shut in by the floe ice, so that even our steamer could not push her way in. After an unsuccessful attempt to enter Cumberland Sound through the heavy floe ice, the ship sailed northeastward toward Disco Island, on the Greenland coast; and from the time that we lost sight of the American land until we again returned to this very place no floe ice was seen, although we went nearly 600 miles further north. Again and again we were in the midst of great masses of icebergs which had been broken off from the front of the immense glaciers that end in the sea; but the sea or floe ice, which was so abundant on the American side, had by this time entirely disappeared from the Greenland coast. On our return to Baffin Land, early in September, another attempt was made to enter Cumberland Sound, and this was successful only after three days of effort to penetrate the barrier of ice, including a halt of about sixty hours, when we

were held firmly in one place, being unable to move either way.

Therefore, along this part of the coast, during the year 1896, there was ice throughout the entire summer; and by way of contrast practically no floe ice was seen on the Greenland coast. This difference explains the differences in climate that were mentioned. There is a constant presence of floe ice in the south-moving current of water, whose temperature is therefore kept at about the freezing point, and this current, going southward past Newfoundland, bathes the shores of Nova Scotia and of New England, north of Cape Cod, with water that has been chilled in the Arctic and that has borne ice southward, until the warm conditions of the temperate latitudes caused it to disappear.

What has been described for the Atlantic applies almost equally to other parts of the world, although no ocean shows such marked differences as the North Atlantic. In the Pacific, for instance, there is no cold Arctic current, because the opening between the Pacific and Arctic is too small to permit a large body of water to move southward; and in the southern oceans the movement of the cold Antarctic waters is not impeded by the land, and hence passes mainly eastward, driving around the earth to the southward of the southernmost parts of the continents. Nevertheless, even here there is some northward movement of the cold water of the frigid zone, so that the southernmost lands are cooled by it.

It may be stated as a law that the eastern coasts of continents have lower temperatures than the western, for the reasons mentioned above. The reason why the warm currents bathe the western coasts, while the cold waters flow along the eastern shores of the land, is that the earth in its rotation deflects all moving currents, whether of air or water, to the right in the Northern Hemisphere and to the left in the Southern. Therefore, the current starting in the Arctic and moving southward, being turned toward the right, if land does not prevent, moves toward the west; but if land does interfere, as finally happens, it passes along the coasts and keeps close to them. A current starting in the tropical belt and moving northward, as in the case of the warm equatorial current which eventually forms the Gulf Stream, is caused to turn toward the east, and hence away from our coast. This is the reason why the Gulf Stream, after passing between Florida and Cuba, and starting up the American coast, gradually turns off across the Atlantic, leaving our country to come under the influence of the cold Labrador current, and, passing across the Atlantic to the European coast,

produces the result at first mentioned, that the zone of habitation and civilization of Europe extends much further north than that of the American side.—The Independent.

Signaling through Pipe Systems.

Considering that, in cases of mishaps and accidents, it is always desirable to have more than one means of communication, Schale has been conducting experiments on the distance through which pipes, such as are used in mines, may be relied upon for conveying signals. From the report in the Zeitschrift für Berg., Hütten- und Salinenwesen in Preussen, it would appear that straight pipe systems will carry the sound a long way, but that side branches are less reliable. Schale made experiments in Westphalian coal mines, using the sprinkler pipes put up to lay the dust. These were mostly galvanized wrought iron pipes, from one to two inches in diameter, suspended by wires or hooks, or placed in conduits, and connected by flanges with rubber packing, or fitted into one another with hemp packing. The branches generally join under right angles. He first used a funnel-shaped mouth-piece, but found that his hands were a better help. Slowly spoken words could be understood at the extremities of straight pipes 1,600 feet long, especially when the pipes were firmly fixed. Whistle signals were much less distinct; tapping the pipes answered best, of course. Every side branch decreases the efficiency. Yet communication was fairly good, for instance, with a pipe 160 feet long, divided into two side branches, and the main pipe being further continued through a connection containing a valve to two other side branches, each of the four branches having a length of 700 feet. Signals from the starting point were received at all four lateral ends, but communication between the sides was difficult. For spoken words, the diameter of the pipe ought to increase with its length; but wide pipes require a more powerful voice. It is noteworthy that words will not pass well from a wide pipe into a narrower one.

To strengthen mucilage, an addition of chrome alum is recommended. It would be advisable first to make a trial with the addition of 1 per cent of a 5 per cent chrome alum solution to the gum arabic, then the suitable proportion can be easily found out. The following mixture has also been found to be effective: Six parts joiner's glue, soaked in cold water a day previously, are dissolved with 2 parts sugar and 3 parts gum arabic in 24 parts hot water, and boiled till the mass is thinly liquid.

RECENTLY PATENTED INVENTIONS.

Engineering.

STEAM BOILER.—Enos Hook, New York City. This boiler has an outer and an inner shell, with water tubes depending from the top of the inner shell to receive heat from a fire chamber therein, while water tubes are secured by their ends within header boxes affixed to the inner shell of the boiler and in open communication with the water space. The tubes hung from the crown sheet of the water chamber receive heat from the fire chamber and the hot air passage at its rear, the boiler being designed to have increased efficiency by the provision of greater heat-receiving area than in boilers of this class as heretofore constructed.

REVERBERATORY FURNACE.—Henry L. Charles, Butte, Mont. In furnaces for smelting and refining copper and other ores, this invention provides improvements whereby the gases are carried off in a simple manner and the cost of fuel and working reduced to a minimum, the working of the furnace being completely under the control of the operator. A flue is curved downward from one end of the hearth and a bridge located between the flue and the hearth, while an arch built over the bridge runs transversely with reference to the hearth, the arch having vertical perforations opening at the top of the furnace to regulate the draught passing over the bridge.

WATER RAISING DEVICE.—William S. Lempert, Marfa, Tex. To raise water by means of a compressed fluid, such as air, affording a continuous flow of water, according to this invention, a box completely submerged, and made with two compartments, has two water inlet valves adapted to swing inward and open when the pressure outside is greater than that within, the water thus filling each compartment successively, the top of each of which is in communication with an air supply pipe from an air compressor, the valves being set by an automatic device or turned by an operator to connect with either compartment, according to the time required for filling and emptying the compartments. The air pressure in a filled compartment forces the water to be raised and discharged through the outlet pipe.

Railway Appliances.

CAR COUPLING.—Lewis L. Bigelow, Delta, Col. This is a coupling of the hook and catch type, adapted to automatically couple with a similar coupling or to receive the end of a link projected from a common car coupling. The coupling bar has at one end an elongated link and at its other end a catch block with a locking face, a tripping lever pivoted in the drawhead having interlocked connection through a dog with the catch block, while a coupling pin on each drawhead is adapted to engage a link of the coupling of a meeting car.

RAILROAD RAIL FASTENER.—Giles D. Mims, Edgefield, S. C., and Samuel K. Dunkle, Finleyville, Pa. To connect together the ends of railroad rails

and secure them to the ties, this device comprises two splice plates having bolts for fastening them to the web of the rail, and each provided with integral tongues extending beneath the rail base to the opposite side from the one on which the plate lies, and there provided with spike holes. There is a slight spring to the plates when they are clamped against the rails, and the fastening is designed to afford a very firm and strong joint, effectively preventing the spreading of the rails under the lateral thrust of the car wheels.

SWITCH OPERATING MECHANISM.—Charles W. Yerbury, Newark, N. J. This invention relates to electrical mechanism for operating switches on electric railways, providing therefor a comparatively simple and inexpensive system which will be completely under the control of the motorman. The switch carries an armature, on each side of which is an electromagnet, there being a number of circuit closing devices forward and rearward of the switch, and means carried by the car for operating the circuit closing devices to close a circuit through the electromagnets from the trolley line wire.

Mechanical.

BALL BEARING.—Heinrich Meltzer, Ratibor, Germany. This bearing comprises a box through which a shaft extends, and on the inner wall of the box is a series of spring rings, arranged in pairs and bent slightly toward each other, a series of balls being held between each pair of rings, by which the balls are kept normally in line, while yet a slight lateral deviation is permitted when side strains occur. The rings are of such form as to fit with their peripheries close against the inner surface of the cylindrical bearing box, while their inner edges extend slightly beyond the diameters of the balls.

BOX FOLDING MACHINE.—William Lederer, New Haven, Conn. In machines for handling pasteboard blanks and making pasteboard boxes, this invention provides improvements whereby the machine is adapted to take the blanks as they come from the scoring machine and fold them into their proper shape, pasting one edge and securing the edges together, the scoring machine being attached to one end of the machine. The machine may be adjusted for boxes of any size, and to make several boxes at once or one large box, the machine simply folding and pasting the body of the box, the boxes being discharged in the form of flattened tubes, to be finished by hand.

WINDOW GLASS CUTTER.—Charles J. Meissner and Francois Koenig, Boston, Mass. To facilitate the accurate cutting of a pane of glass without danger of breaking it, as is frequently the case when an ordinary yard stick is laid on the glass and a cutter run along one edge, this invention provides a device consisting of a fixed guide on which a graduated stick is movably held, a holder being adjustable and adapted to be secured on the stick. The device is simple and inexpensive, and readily adjustable for its work.

REGISTERING MECHANISM.—George A. Smith, New York City, and Samuel P. Freir, Hasbrouck Heights, N. J. This mechanism is especially adapted for convenient attachment to a typewriter or other machine for counting periodic movements, as for registering and indicating the periodic depressions of a word-spacing bar, and thus registering the number of words written. Provision is made for the return of the registering mechanism to zero at any point of its movement, and the register is also adapted for use to indicate the paging of a book, the rotation of bicycle wheels, and other purposes.

Agricultural.

CHURN.—Henry H. Coppock and Frank W. Miller, Pleasant Hill, O. This churn has a four-sided body or cream receptacle in which is rotated a horizontal dasher shaft, carrying radial arms to which are attached dasher blocks having a diagonally beveled front portion and a concave rear face. The blocks are arranged out of line on the shaft, and the beveled portion of each block throws the cream laterally against the following block, causing a thorough agitation of the cream, while the concave rear faces of the blocks cause a vacuum behind each block to draw in and further facilitate the thorough agitation of the cream.

MILK STRAINER.—John Littlejohn, Aurora, Ill. This device has an upper funnel, forming a hopper, and a lower funnel which has a cuplike receiver forming a sediment chamber for a lower strainer depending from the upper funnel, there being an upper strainer in the shape of an inverted truncated cone at the lower end of the upper funnel. The strainers are inverted or inclined above sediment chambers, and the improvement permits the use of finer meshed straining cloth than is ordinarily employed.

MILK COOLER.—Simeon Snider, Palatine, Ill. This is a device for use in connection with a flowing supply of water, which is passed through a pipe journaled to swing back and forth in the tank in which the milk to be cooled is placed. The pipe has angular end bearings in the end walls of the tank, and at its discharge end is connected with a counterweight arm, the discharge of water being made alternately into one of two buckets which have vertical movement, and the filling of each bucket causing its downward movement and a swinging of the cooling pipe from one side to the other in the tank, thus facilitating the rapid cooling of its contents.

FARM GATE.—Stephen E. Auken, Rushville, Neb. This invention provides a swinging gate adapted to be raised at its outer end to avoid snow, etc., and to counteract sagging. It has two end uprights, one or more intermediate vertical pickets, a diagonal brace to which the uprights and pickets are pivotally connected, and a series of horizontally strung wires permanently secured at one end of the inner of the uprights and stapled or otherwise connected with the pickets, while their outer ends are attached to adjusting keys in the outer one of the uprights.

Miscellaneous.

MUSICAL INSTRUMENT.—Silvester Hoasley, Gosport, Ind. As an instrument designed as a substitute for a pipe or piccolo, and one permitting the performer to readily imitate the whistle of birds, the device provided by this invention comprises a piston fitted to slide in the barrel of a whistle, keys being connected with the piston for moving it in the barrel, and the keys being of different lengths to move the piston to different positions, there being a tuning attachment, and the whole being carried by a suitable frame consisting of a standard with brackets.

WIRE STRETCHER.—Daniel H. Jones, Lenoir City, Tenn. This is a machine especially adapted for the stretching of fence wires, and comprises a number of winding drums mounted on a suitable supporting frame, wire clamps being connected to the drums and two cam levers arranged end to end on the base, one of them being rigid and the other pivoted, while an angular guard extends along the upper edge of the stationary lever to hold the wire thereon, the wire jamming between the peripheries of the levers. The drums connected to the clamps are rotated by a crank handle to tighten the wires, the machine being also applicable for stretching telegraph, telephone and electric light wires.

WASHING MACHINE.—Richard N. Brent, Wellington, Kansas. The body of this machine is a circular, tublike vessel in the bottom of which freely turns a ribbed disk, while an upper disk, ribbed on its lower side, slides and turns on a perpendicular shaft, a handle being connected to the shaft, so that by swinging or oscillating the handle, both disks are oscillated in opposite directions. The clothes are submerged in the wash water between the disks, the upper disk being pressed down upon them by a spring on the upper end of the shaft, whereby the clothes may be effectively rubbed without being torn or injured.

Designs.

CHECKER BOARD.—Henry A. Rackleff, Woodford's, Me. This board is an equal-sided triangle, and on it is a series of similar small triangles, the various rows or series being arranged in pyramidal form.

CASE.—Adelbert E. Foutch, New York City. This design is for cases adapted to contain stereoscopic goods, such as glass and pictures, the case being divided interiorly into several properly proportioned compartments and exteriorly representing two or three books placed one on the other.

LAMP BODY.—Charles J. Seiter, New York City. This design represents a flower, some of the leaves of which are brought together, forming a hollow upper globe, while others are dropped to constitute a lower draping section.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co. for 10 cents each. Please send name of the patentee, title of invention, and date of this paper.