

for the "Columbia." The rudder post is about 27 feet in length over all. It enters the hull between frames 59 and 60. Here it is provided with a stuffing-box to prevent the entrance of water. The rudder consists of bronze plates riveted upon a frame, as shown in the enlarged drawing, and it is 4 inches thick at the post and tapers to between 1 and 2 inches in thickness on the outer edge. To the top of the rudder post is attached a steering quadrant, of the form shown in the small drawing of the same. It extends to the rear and downwardly and engages a bevel wheel carried at the bottom of a vertical shaft which rises through the deck, and carries at its upper end another bevel wheel, which is itself in engagement with a bevel wheel on the shaft of the steering wheel. Immediately below the quadrant the rudder-post passes through a heavy casting which is bolted to a plate steel foundation and serves as a top bearing for the post and at the same time carries practically the whole weight of the rudder, which is kept in place by the usual pintles and gudgeons. At frames 20 and 60 are watertight bulkheads of light plating.

Will "Columbia" win? We can only say that she is a logical development and an unquestioned improvement on "Defender," and "Defender" is a few minutes faster than the fastest boat that has ever come for the "America" cup.

SEA LION ROOKERIES OF SOUTHERN CALIFORNIA.

BY C. F. HOLDER.

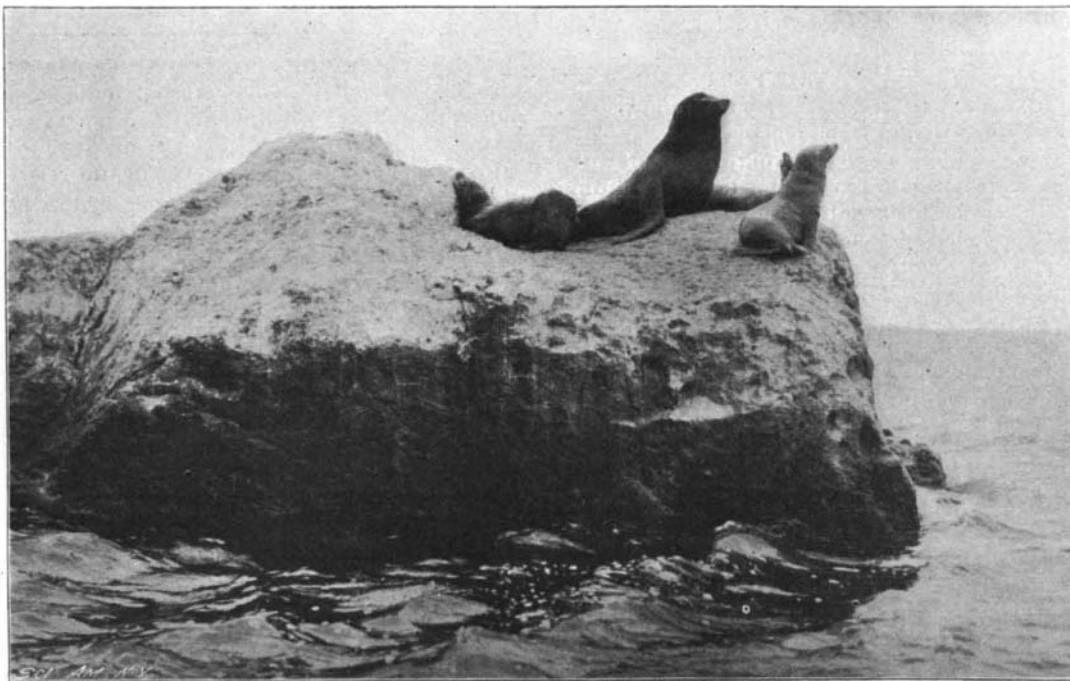
The fact that the authorities of San Francisco, in answer to an appeal from the fishermen, have begun a warfare against the sea lions of the vicinity, calls attention to the few remaining and very interesting rookeries in Southern California. A half century or so ago sea elephants lived in large herds on Santa Catalina Island, but they were utterly and completely wiped out of existence by the sea elephant hunters, who waged continual war upon them. The same influence has been directed against the sea lion, which is soon destined, if not protected, to disappear from the Pacific coast of North America.

One of the most interesting herds found in Southern California is on Santa Catalina Island. The rookery is on the extreme southeastern end, where a small group of rocks rise above high water and are connected to the mainland at low water. Here the sea lions make their headquarters and live unmolested, being protected by local rules. They number perhaps one hundred, and are controlled or dominated by two or three large bulls. The accompanying graphic photograph shows about one-half the herd on the beach in the month of May, when they leave the rocks and take to the beach near at hand, where the young are born. The herd is shown menacing a boat which is floating off the shore, the photographer being in the near foreground.

Their actions are very interesting, and at this time they make vigorous protests when a fishing boat approaches; yet they are so tame that they allow visitors

grounds, some inquiries were made at the island mentioned; but while it was acknowledged that the one hundred or more sea lions consumed large quantities of fish, except in certain instances to be referred to, the animals were not considered a nuisance. I believe, however, that the sea lions devour a vast amount of fish and that the fishermen do not appreciate or feel it, as this island is remarkably rich in its supply of fishes. The sea lions bask on the rocks nearly all day.

haunt the wharf at Avalon. Standing upright at the bottom, with their tails resting upon it, they watch every movement of the angler, deftly removing his bait when thrown over. At other times they have been known to follow the boat and drive all the fish away which the fisherman by patient chumming had gathered about him. A Venetian fisherman at this island informed the writer that a sea lion often accompanied him to his gill-nets, and every few moments



SEA LIONS BASKING.

and at about four o'clock start out, singly or in groups, on a feeding trip upshore. The young sea lions, the yearlings and two-year-olds go in bands, and often make their trip apparently for pleasure. They enter Avalon Bay like porpoises, swimming at the top of their speed, bounding out of the water in twos and threes and more, making the circuit of the bay in a few moments. After dark, generally from nine to ten or later, the large sea lions enter the bay to feed. They are scavengers in a sense, feeding on any dead fish that may have been washed offshore or thrown away by the fishermen. At this time they make the little rock-bound bay reverberate with their barking. Bringing the fish from the bottom, they rise to the surface and, with violent swings from side to side, endeavor to tear it into pieces, in which they ultimately succeed. The old males are rarely if ever seen feeding in the daytime.

The actions of the large sea lions in feeding here are most interesting, and their speed under water is marvelous. The writer once took as a point of obser-

descended to investigate, and literally took the fish from the nets as fast as they entered, rising to the surface and tossing them into the air in seeming derision and outraging every sense of propriety. Yet these fishermen have never made a formal complaint against the seals and sea lions. The reason is doubtless that the sea lion rookery is an attraction to tourists, and nearly all the fishermen are interested in transporting them to the seal rocks; hence what they may lose by the depredations of the animals they gain again in exhibiting the rookery as a curiosity, charging twenty-five cents for the trip. Yet in the opinion of the writer it might be well to restrict the growth of the herd by removing some of the males to other localities. Each seal eats not less than ten rock bass or white fish per day, which at a minimum means the destruction of four or five thousand fish from this region daily. Curiously, the best fishing ground about the island is within two hundred feet of the rookery.

On San Clemente Island, twenty miles distant, there are two or three good sized rookeries where the animals are comparatively unmolested and where the schools of fish are so plentiful that the ravages of the sea lions are not felt. The writer after much difficulty visited the sea lion rookery on the island of San Nicolas, eighty miles northwest of Santa Catalina. It lies on the leeward side of the island and was at first in very much the same situation as that of Santa Catalina. Here there were a large number of sea lions, but the single lone herder of the island was doing his best to drive them away, and had partly succeeded by shooting into them with bird shot. His hut was near at hand, and the roaring and barking of the animals, according to his statement, made sleep almost impossible; he also said that the animals were dangerous and would attack any one infringing on their domain.

On the island of Santa Cruz, one hundred miles north of Santa Catalina, three distinct rookeries were visited by the writer, one only being large. On Anacapa Island there is a small rookery, and a large one and several small ones on Santa Rosa. In all, there are probably at least one thousand sea lions and seals on the Southern Californian islands, devouring five thousand pounds of fish per day—a large amount, yet hardly appreciable when the vast food supply is taken into consideration, and it will be some time before the sea lions will have to be destroyed to protect the fisheries.

American Exhibits at Paris.

Space is now being actively assigned to American exhibitors. At present the allotments are tentative, and as soon as possible the permanent allotments will be made and the exhibitors will be notified of how much space they will have and where it will be. While no State buildings will be permitted, any State in the Union that contributes a certain amount to the general fund will have a special room assigned to it in the national building.

Several American attractions are planned. One is to be a gold column of the value of \$1,000,000; another will be an American trolley line, and the third will be a pier landing, where Americans will take steamers carrying the American flag for the Vincennes woods.



HERD OF SEA LIONS ON SANTA CATALINA ISLAND.

to row within fifteen or twenty feet of them and appear to be perfectly indifferent. Santa Catalina is nearly sixty miles around and offers many inducements for seals and sea lions at various points; but for some reason they have selected this spot that is by no means smooth, though it can be called a lee, and is open to the fierce southeast gales of winter; in the summer and most of the year the rookery is protected.

In view of the complaint of the fishermen of San Francisco that the sea lions were devastating their

vation a high cliff from which every object on the bottom could be distinctly seen. At one time a single sea lion had surrounded a school of sardines, so terrifying them that they formed a dark ball about six or seven feet around, into which the seal constantly plunged, taking the small fry by the mouthful. The school was so completely terrified that they did not move twenty feet in an hour remaining in the same general position.

So tame are certain sea lions that they sometimes

Mesopotamian Medicine.

Until recently the only evidence as to the state of medical knowledge in ancient Babylonia and Assyria was derived from the list of ailments preserved in the so-called magical cuneiform tablets, which consist of conjurations against various diseases or injuries and the respective demons supposed to be responsible. Now, however, that the study of cuneiform writing has advanced and the number of texts published becomes much greater, documents are coming to light appertaining to medical matters. An American student, Dr. Christopher Johnston, has paid some attention to them, and from his researches the following notes are mainly derived. From Assurbanni-pal's library have come several letters from physicians, of which four or five are from one name, Arad-nana. One of these is a report to the king of his brother's health. A more interesting relic is a tablet regarding a person who seems to have been suffering from facial erysipelas, though it may have been a case of ophthalmia. The letter, omitting the customary address to royalty, is as follows: "All goes well in regard to that poor fellow whose eyes are diseased. I had applied a dressing covering his face. Yesterday, toward evening, undoing the bandage which held it, I removed the dressing. There was pus upon it the size of the little finger tip. All is well. Let the heart of my lord the king be of good cheer. Within seven or eight days he will be well." Another letter runs thus: "With regard to the patient who has a bleeding from the nose, yesterday there was much hemorrhage. Those dressings are not scientifically applied. They are placed upon the alæ of the nose, oppress his breathing, and come off when there is hemorrhage. Let them be placed within the nostrils, then the air will be kept away and

the hemorrhage restrained. If it is agreeable to my lord the king, I will go to-morrow and give instructions; meantime let me know how he does." This is evidently an instance of a patient suffering from epistaxis. External compression had been tried and failed, whereas plugging the nares is recommended. The name of another Assyrian physician, Iquisa-Aplu, is known because he was by royal command sent to minister to a famous general named Kudunu, who lay ill at Erech, and he was able to report that he had cured his patient.—Lancet.

The Unveiling of Franklin's Statue.

At last Philadelphia has erected an adequate memorial to the great Benjamin Franklin. The bronze statue which was presented to the city by J. S. Strawbridge was unveiled on June 14. The statue is the work of Sculptor John J. Boyle. The ceremonies were very imposing at the presentation, and were attended by the representatives of several important institutions and societies. Addresses were made by the United States District Attorney James M. Beck and Major Josiah Quincy, of Boston.

Casting Steel in a Vacuum.

Prof. Dewar's success in liquefying hydrogen is bearing fruit. A company has been formed with a capital of \$150,000 to determine whether steel can be cast in a vacuum or not. It is hoped, if the plan is successful, that the air bubbles that now cause flaws and weaknesses will be done away with, and that the metal which is produced will be wonderfully homogeneous. The practicability of the process is to be then tested on a large scale.

The Current Supplement.

The current SUPPLEMENT, No. 1225, is of unusual interest both on account of the variety of the articles and their interest. "Boston's Free Municipal Bathing Plan" is a most interesting article by J. A. Stewart, and was referred to editorially in our last issue. It describes a remarkable system of summer and winter baths in use in Boston. "The Physiological Basis of Mental Life" is a paper by Professor Hugo Munsterberg. "Women Inventors" is an article by G. E. Walsh. "Mechanical Influence in Architecture" is a profusely illustrated paper by G. W. Percy. "The Forest Tent Caterpillar," is an illustrated article by Clarence M. Weed. There are a number of other articles on "How to Figure a Chainless Gear," "A New Primary Battery Cell of Large Capacity and High Economy," and "Plan for the Widening of the East Side New York Streets." The usual notes and consular matter are published.

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RECENTLY PATENTED INVENTIONS.

Electrical Apparatus.

CIRCUIT AND APPARATUS FOR BRIDGING TELEPHONES.—CHARLES T. MASON, Sumter, S. C. The present invention is a multiple-station telephone-circuit having at each station a normally-closed bridge of the main line, including both bell-ringing magnets of low resistance and the armature-coils of the generator. The bell-magnets are permanently in series with the generator and are adapted to be shunted in signalling. The combination of generator and ringer parts produces in the permanently-bridged circuit at the unoccupied stations, a high coefficient of self-induction of great impedance to the rapidly-alternating voice-currents, preventing them from short-circuiting or becoming materially weakened by passing through the permanently-bridged circuit of the stations not in use.

TELEGRAPH RECEIVER OR RELAY.—JOSE GALLEGOS, San José de Guatemala, Guatemala. Connected with an electromagnet core is an eccentric pole-piece mounted to turn about the longitudinal axis of the core. An armature is pivoted about an axis perpendicular to that about which the pole-piece may turn. A circuit-closer is controlled by the movement of the armature. By swinging the eccentric pole-pieces on the axes of the respective cores, not only are the distances of the pole-pieces from each other adjusted; but the distance of the pole-pieces from the armature is varied, thus enabling the leverage of the magnetic force exerted upon the armature to be increased or decreased.

Engineering-Improvements.

STOP-MECHANISM FOR ENGINES.—JOSEPH MATTHEWS, New Bedford, Mass. The stop-mechanism comprises a novel arrangement of a movable cylinder having a diaphragm against the sides of which pressure can be applied from pipes communicating with a main pressure-pipe provided with a number of relief-valves. Should it be desired to stop the engine in case of an accident, one of the relief-valves is turned to close the main pipe to permit water to escape in order to reduce the pressure on one side of the diaphragm. The pressure on the other side will move the cylinder, thus causing the engine valve to close, the parts being held in this position until it is desired to start the engine again.

ROTARY ENGINE.—EDWARD W. COLLINS, Coalville, Iowa. The cylinder of the engine has oppositely-arranged sets of inlet and exhaust ports. The concentric piston rotating in the cylinder is provided with oppositely-arranged, lozenge shaped piston-heads. Oppositely-arranged sets of spring-pressed abutments extend into the cylinder, and are adapted to be pressed apart or opened by the heads. Sliding cut-off valves control the inlet of the motive agent to the cylinder. Cams on the piston-shaft control the movement of the cut-off valves. A rotatable reversing valve is provided for each set of cylinder ports.

Mechanical Devices.

LOCK.—OSCAR KATZENBERGER, San Antonio, Tex. Although tumblers are used in this lock, set according to a predetermined combination of figures with letters, the bolt and the latch can be operated from the same knob-spindle when the proper combination has been found. The tumblers may be placed in such combination that they will not act upon the bolt. The lock and latches may be operated from the same spindle. The lock is so constructed that no key is required, or it may be so made that a key can be used to operate the tumblers from the outside of the door, the key in such instance being used instead of a knob.

SCALPER, GRADER, PURIFIER, AND BOLTER FOR FLOUR.—ADAM W. HAAG, Reading, Penn. In the upper portion of the frame of this machine a casing is mounted containing a scalping-screen. A purifying-casing below the first-mentioned casing, communicates therewith and contains a screen. A rotary fan is mounted above the screen to collect the fine screenings. The casings have all a gyratory motion. The flour, in passing from screen to screen and from casing to casing, is very

effectually scalped, graded, purified, and bolted, the material too coarse for one screen being passed to another, so that at the end of its course the flour is uniformly refined.

APPARATUS FOR WEAVING.—LÉON DESMARAIS and LOUIS CANAL, Paris, France. The loom has a means for holding the warp-threads and a series of movable heddles or needles for individually raising and lowering the warp-threads, the heddles being carried in the same plane to form a longitudinal row or series. This series of needles is mounted to turn bodily about the axes of rotary cylinders standing at an angle to the plane of the warp threads; whereby the series of needles may be caused to assume a line more or less oblique relatively to the direction of the warp-threads. The combination of the movements of the needles and of the cylinders enables fabrics to be manufactured which, up to the present, could be produced only by the Jacquard mechanism.

PRINTING-PRESS.—JOHN C. MOLLOY, Cincinnati, Ohio. The inventor has endeavored to simplify the construction of job-printing presses. His press is so constructed that a sheet can be simultaneously printed upon opposite sides, and that the feed of the paper from a continuous roll may be regulated to suit any size of sheet. After leaving one form printed upon one side, the sheet is automatically delivered to the second form, which will print upon the opposite side. While the second impression on the first sheet is being made, the first impression on a second sheet is simultaneously made.

WIRE FENCE MACHINE.—MILES H. STARLING, Lowell, Ohio. This machine has a base-frame which supports a main frame. The main frame in turn carries wire supporting and stretching devices, and a post-driving frame having a guide for the wires leading from the stretching devices. The main frame can be adjusted on the base frame whereby the wire stretching and guiding devices may be kept in vertical alignment regardless of the character of the ground-surface.

CENTRIFUGAL MACHINE.—FRANK L. DEPEW, Brookline, Mass. Mounted in a gyrating bearing is a spindle to which a basket is attached. A pulley is provided, the hub of which has a flange held to the basket. Below the basket and above the pulley, a pulley-shield is mounted having a central orifice through which the spindle extends, whereby the spindle can gyrate with the basket. The pulley-shield has an upwardly-extended flange around the opening, running up near the flange on the hub of the pulley.

MECHANICAL DEVICE.—FRANCIS K. GAFF, Hamilton, Ohio. This invention is an improvement in devices having jaws, the object being to provide an arm or jaw of simple construction. The device comprises a bar on which a jaw is movable. A yoke engages around the bar and the movable jaw; and upon the yoke a clamping-head is eccentrically mounted, engaging with a projection upon the movable jaw.

Railway-Appliances.

TIE.—SAMUEL McELPATRICK, Princeton, Ky. It is the purpose of this invention to provide a tie which holds the rails in place without the use of spikes. The tie comprises two similar sections having vertical members arranged to abut and formed with recesses to receive the rails, and overhanging lugs for engagement with the rail flanges. The vertical members are further provided with elongated slots between the rail-receiving recesses. The slots are adapted to receive a bolt whereby one section may be slidably held upon the other section when the tie is being adjusted to the rails.

TIE-PLATE.—ALEXANDER B. B. HARRIS, Bristol, Tenn. The tie-plate has four spike holes or seats arranged in pairs, one pair of which is offset from the alignment of the other pair. The plate is provided with means for fixedly anchoring it to the tie, so that when the plate is thus anchored to the tie, the rail may be adjusted laterally by drawing the spikes from one pair of holes, shifting the rail laterally, and then driving the spikes in the other or offset pair of holes.

SAFETY RAIL-BRACE.—JOHN A. McCANN, Quincy, Ill. This combined metal brace and tie is composed of a

flat plate having an integral tongue formed of a bent-up portion of metal cut out of the tie. A spike is driven through the opening beneath the tongue and is engaged thereby. The device, it is claimed, maintains a perfect gage, preserves the wooden ties by preventing the rails from cutting into them, and prevents the wear of the rails by the lateral motion of the rolling-stock.

HOSE-COUPLING.—WALTER G. MILLER and WILLIAM L. HARRIS, Lodi, N. Y. It is the purpose of this invention to provide a hose-coupling so arranged that when a train parts, the brakes in the rear section are gradually applied to bring that section slowly to a stop; while the brakes in the forward section remain under the control of the engineer. Each member of the coupling has a valve, means being provided for holding the valves open when the members are locked together, and also means for allowing the valve in the forward portion to close completely, and the valve in the rearward portion to close partially upon separation of the members.

TRIPLE-VALVE.—JAMES H. FARRELL, Harrisburg, Penn. This triple valve for air-brake systems has a slide-valve with a graduating-valve therein, a slide-valve piston, and two auxiliary valves. One auxiliary valve is carried by the slide-valve and the other by the stem of the slide-valve piston. These auxiliary valves control a communication between the train-pipe and the auxiliary reservoir to recharge the latter to full train-pipe pressure at the time the brakes are applied.

RAILWAY-INDICATOR.—MARK MORROW, Percival, Iowa. The indicator is designed to be used to display announcements of changes in ticket-rates, schedules, and the like, at railway-stations. The apparatus is provided with an apron or sheet of canvas attached to and held stretched between parallel rollers, so that it may be wound from one to the other in order to bring into view cards or sheets bearing the announcements.

Miscellaneous Inventions.

SHOE-LACE FASTENING.—MORRIS H. LIPMAN, Manhattan, New York city. The invention provides a shoe that may be quickly and conveniently fastened with a single lace, manipulated with one hand. This ready manipulation is effected by means of a peculiarly-constructed eyelet, serving to receive and hold the end of the lace, thus avoiding the necessity of tying a knot.

TENSION DEVICE FOR TWINE-BINDERS.—OTIS B. LOSTEDT, Rippey, Iowa. The device is adapted to be carried on the cover of the twine-box of binding-machines, and is designed to regulate the tension of the twine, irrespective of variations of strain and of form. The means by which these ends are attained comprise essentially a grooved wheel around which the twine is passed, the wheel being provided with a spring-pressed brake-bar actuated by a stop on a guide-plate. By means of this device the twine may be drawn from the box with uniform regularity, despite the variations of the strain due to the action of the knoter.

VALVE-REGULATOR.—GEORGE W. LAMBERT, Orange, Mass. This valve-regulator for water-power wheels, has a cylinder in which is mounted a piston connected with the valve to be regulated. A valve controls the inlet of a motive agent to the cylinder and is operated by an electric circuit. A governor operates a circuit closing and opening device. The speed of this governor is regulated by mechanism controlled by the piston.

LET-OFF AND TAKE-UP FOR LOOMS.—AUSTIN J. HANKS, Wilmington, Ohio. To provide a let-off and take-up for looms whereby the warp is properly unwound or fed from the warp-beam, and the woven cloth is wound up on the cloth-beam as fast as required at a uniform tension, is the purpose of the present invention. With the warp and cloth beams is connected a lay provided with an angularly-extending arm rigidly secured thereto and independent of the operating mechanism. A shaft geared with each beam is operated by a pawl-and-ratchet mechanism. Flexible connections between the arm of the lay and the pawl-and-ratchet mechanisms are secured to the free end of the arm of the lay at different points, whereby the beams will be simultaneously and positively operated from the lay, and

one beam will be turned a greater distance than the other.

STEERING MECHANISM.—KEUBEN H. FREEMAN, Fergus Falls, Minn. Above the vertical shaft of the rudder a horizontal shaft is mounted, having right and left hand screws which receive nuts. With these nuts the rudder is connected. By rotating the horizontal shaft through the medium of a hand-wheel, the nuts will be either brought together or separated, turning the rudder accordingly.

COUPLING AND DRAFT-CUSHIONING DEVICE.—MATHIS FINK, Chaska, Minn. This invention is concerned with means for connecting a traveling power device with the load to be drawn, and provides a simple device which can be readily connected with the source of power (a portable steam-engine or horses attached to a draft-truck) and also with the movable load (a heavy threshing-machine or a hay-loading device). The coupling device is so constructed that a spring-cushion will be introduced between the motive agent, such as a traction engine, and the load which it is to pull, whereby the inertia of the heavy load will be gradually overcome and danger of injuring or breaking the coupling-device be obviated.

INSECTICIDE.—ELIUS F. EICHHOLTZ, Conway, Wash. The insecticide consists of flour of sulfur, carbonate of iron, charcoal, and blue-stone. The compound is placed in a hole bored into the infested tree or plant; and the outer end of the hole is then plugged. The insecticide, it is claimed, will be dissolved by the sap and circulated to all parts of the plant.

PNEUMATIC PROPULSION OF VESSELS.—WALTER CARR, London, England. The vessel to which this system of propulsion is to be applied has air-emission passages terminating in orifices extending across the bow and stern. The air is uniformly distributed across the full breadth of the propelling surface and can be conducted either to the bow or stern-emission orifice for either forward or backward movement, and for steering. There are also provided induction steam and air jet apparatus, steam-generators, means of reducing the steam-pressure at a point between the generator, and a superheater, whereby the heat necessary is supplied to maintain the temperature of the steam or to increase it, notwithstanding the loss of sensible heat incidental to the reduction of pressure.

CHAIR.—WINDSOR O. and EVA K. CAMPBELL, Sulphur Springs, Ark. This chair is a piano-chair comprising a frame in which levers connected with the seat are mounted to rock. A rack is secured at its upper end to the frame, and on the rack a sleeve is mounted to move and has a handle extended from its lower end. By moving the sleeve down on the rack, the outer ends of the levers will be swung upward and the seat will be elevated. By moving the sleeve upon the rack, the seat will be lowered.

LOG-THAWING APPARATUS.—SAMUEL W. BUTTERFIELD, Three Rivers, Canada. The present invention provides an apparatus especially designed to thaw logs used in making paper-pulp. The apparatus has a casing through which the logs pass. A conveyer in the bottom of the casing carries the logs through the casing. Apertured steam-pipes discharge jets of steam upon the logs as they pass through the casing. Self-closing doors retain the heat within the casing after a log has passed.

CARBONATING-MACHINE.—FREDERICK W. ZINGSEM, Brooklyn, New York city. The machine comprises a cylinder in which a mixing chamber is suspended inclosing a propeller-beater which mixes the gas and liquid. Water-supply and gas-pipes lead into the cylinder. In operation the liquid under pressure will run through its pipe and at the same time the gas will be discharged into the water discharged from the water-pipes. The discharged water and gas will strike the beater and cause it to rotate. This rotation will mix the gas and water and throw the solution outward against screens, so that the globules will be finely broken up in order to produce a more thorough mixture.

BELT-HOLDER.—SOLOMON SCHWARZ, Manhattan, New York city. To a strip adapted to be secured to the inside of the belt, wires are secured forming longitudinal