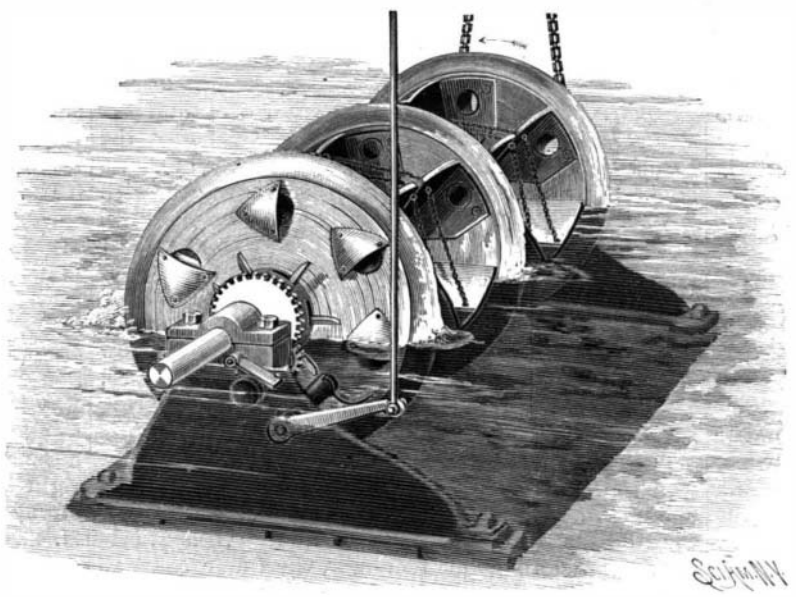
AN IMPROVED WATER MOTOR.

This is a wheel which may be run when either partially or entirely submerged, is designed to be very efficient in proportion to the speed of the current, and has a very simple and easily actuated mechanism for throwing it into and out of gear. It has been patented by Mr. Benjamin F. Rathbun, No. 99 Winslow Avenue, Buffalo, N. Y., and its inventor reports having made some highly satisfactory tests of its efficiency. On a common shaft is a series of wheels, as many as desired, according to the width of the stream, there being on the sides of the wheels outwardly swinging gates adapted to close into recesses in the sides of the wheels when the motor is not in gear. The end wheels have gates on their inner sides only. The gates on one side of a wheel are connected together by chains, so that when one gate swings out to the current it pulls the next one open.

Opposite the gates are holes preventing excessive suction and permitting the current to enter and assist in turning the wheel, but the holes on the end wheels have their outer sides partially covered by deflectors. When the gates open, their inner edges strike against the teeth of ratchet wheels on the shaft, these teeth serving as abutments. Parallel with the shaft are rods on which are arms adapted to turn opposite the gates to hold them closed, but which may also be turned back of the gate hinges to permit the gates to swing outward, as shown in the illustration, which shows the gates as they would appear in a tide or two-way current, while in an ordinary stream the gates on the lower half of the motor would open while those on the upper half would close. The rods parallel with the shaft have end crank arms projecting through slots of two concentric wheels, the outer one of which has teeth to engage a pinion, and these wheels being movable in relation to each other. The gates are held normally locked by the parallel rods, but by pushing the pinion into engagement with the outer wheel the gates are permitted to swing into the current. The machine is thrown out of gear by a pawl or arm engaging the crank arms on the parallel rods. The motor is well adapted to be placed in a stream, to be run by the force of the current.



RATHBUN'S WATER MOTOR.

THE HOTEL MAJESTIC, NEW YORK.

New York possesses some of the finest hotels in the world, and to the Waldorf, the New Netherlands, the Savoy, the Holland, the Imperial and the Plaza, has recently been added the palatial hotel on Central Park West, between Seventy-first and Seventy-second Streets, the Hotel Majestic.

The structure is 150 by 204 feet and the height of the twelve stories is 165 feet. The building, a modified Renaissance structure, is made fireproof and contains 600 apartments. An open exposed court 40 feet wide gives abundant light and air to all the rooms not fronting on the street. Nearly four million dollars were spent in the erection and furnishing of this hotel. The architect was Mr. Jacob Rothschild, who was assisted by Messrs. Reeves and Livingston.

Some of the special features of the hotel deserve attention. A covered driveway for carriages runs entirely through the hotel. The main entrance and foyer are marvels of beauty, being richly decorated in Renaissance designs. The grand salon is furnished in the style of Louis XIV, the dining room in the Empire style of decoration, etc. A spacious winter garden gives the effect of a conservatory. A novel feature is the arrangement of the musicians' gallery, it being so constructed that the orchestra, which plays nightly, may be enjoyed by those in the main dining room, music room, grand assembly, and promenade halls at the same time. In summer the roof garden, occupying a surface area of thirty thousand square feet, offers the guests and their friends a nightly promenade concert, and by day an unobstructed view of the city, the Hudson and the Palisades, while at the door is the Park. The Hotel Majestic is in one of the choicest residence districts, of the city. It fronts directly upon and overlooks the Central Park, with its lakes, trees, green swards, flowers, winding paths, and driveways. The views from the Majestic are wonderful and enchanting.

THE HOTEL MAJESTIC, OPPOSITE CENTRAL PARK, NEW YORK CITY.

Liquid Glue.

Chloral hydrate	250 grammes.
Gelatine	400 "
Water	1000 "

The solution is ready in forty-eight hours, and is said to be excellent for mounting photographs.

The Fate of the Rural Town.

We have heard much in late years of the development of our mountain towns. We have thought the trouble to be in their elevation and the hardness of the soil; but Mr. Fletcher is now telling us in the April Forum that a similar fate is visiting the rural town in such States as New York, Ohio, Indiana, Illinois, Michigan, and Iowa. Indeed, the blight is peculiar to no one section, but extends to every part of the country. The population of the whole country has immensely increased, while scores and hundreds of the rural towns have steadily declined in population and wealth. In view of these facts, we must look for a deeper cause, and that cause we find in the new facilities for travel and transportation. The railway is an immense centralizing power. We are only beginning to awaken to the tremendous significance of this recently introduced material force in our civilization. In its presence all things pass and the whole world is made anew. The immediate results from the introduction of steam as a motive power were felt long ago; the remoter consequences are now being revealed in every cause and in every line of business. The change is nowhere more clearly seen than in the relation of the inland town to the commercial metropolis. When men reached the interior by horse power, by the ox team, or on foot, the rural town had a living chance to advance in population and wealth. For the industrial army which had moved into the wilderness or the open country, the rural village was the new base of supplies. The commissariat must go along with the columns. The large center was too far away. But the coming of the railway abridged distance. It brought the village ten or twenty miles away in touch with the great city, making it a sort of suburb. The outlying depot of supplies is no longer needed; the railway train has taken the place of the country storehouse. Does the change mean the destruction of the rural town? Not at all. The rural town is as important as ever, but in a new way. The railway took up the old base of supplies and carted it away as of no further use. The fortifications around it have been pulled down, and the soldiers of industry who had occupied them have been drawn back to the main base. The industries now find their center, not in the rural village, but in the city a little farther away. What is taken out of the town is simply drawn back into the city. The fictitious importance of the rural hamlet has disappeared, while the agricultural value of the land remains. The agricultural resources of the country must forever be the bulwark of the city. The only peculiarity now is that the city reaches out farther, drawing its supplies, by the aid of steam, not only from an area of five or ten, but of a thousand or three thousand miles around. It draws from the cheapest market, without respect to distance.—Boston Standard.

The Trolley in Rome.

At the present time omnibuses and a few horse cars constitute the principal means of travel in the streets of Rome.

A concession has, however, just been granted to the Societa Romana degli Omnibus for the building of an electric road to run from the general post office to the principal railroad station in that city.

Grades of considerable size will have to be overcome. The overhead Thomson Houston trolley system will be adopted, and it is expected to have the line open for business on September 17 of this year.

Freight Car Doors.

At the January meeting of the Central Railway Club a paper upon the subject of "Freight Car Doors and Fixtures" was read by Mr. J. D. McIlwain, superintendent of the Union Car Company, in which the author presented the claims of a number of door appliances and concluded as follows, in which he represented a committee appointed to consider the subject given in the title of the paper:

"We wish first to repeat the statement made in our previous report, that the coming freight car door, to be perfect in every particular, and satisfactory to both the transportation and mechanical departments, requires the following essential points:

"First, safety; second, protection to the property in transportation, from theft, fire, and water; third, ease of operation; and last, but not least, economy in production and maintenance. We do not believe that the freight car door has yet been produced that embodies all of these requirements perfectly. In our opinion the perfect door should be hung at the top, on antifriction rollers which cannot be derailed. The bottom girders should permit sufficient play between the doors and the car to give the door ease of motion at once after the fastenings are loosened. The fastenings should be designed to close the door tight against the car when locked, and release it when unlocked. There should be a permanent stop or cleat at the back edge of the door when closed, for protection from fire and water. The door posts should be trussed to prevent bulging outward, which is the principal cause of doors binding and the attendant evils. We question if there is a complete door that is not weak in some one of these features, and leave the subject for your digestion."

In the discussion Mr. McIlwain said he thought that door construction was the leading question of today in car design, that is, the providing of "proper doors, properly hung, that will properly protect the property in the car and that will not cost too much for operation and maintenance." The discussion was continued in the March meeting of the club when it was opened by Mr. Perkins, joint freight agent of East Buffalo, who represented the "men who look after the freight and keep track of it." He stated that the number of box cars, not counting those belonging to private car owners, in use in the country was about 512,000, which makes the car doors number over a million. Based upon 200,000 doors opened, closed, and fastened each day, allowing one minute for every complete operation, he figured that it cost $500 per day for this insignificant item, which would become $2,500 if the time occupied was placed at five minutes. This showed the importance of furnishing doors which may be opened, closed and sealed easily and quickly. He spoke of the safety of employes as the matter of first importance in the car door question, applying to the dangers to men in opening and closing the doors as well as those resulting from improperly secured doors upon the road. After enumerating some of the defects which lead to danger of falling doors, he said: "The door of which the least complaint is heard among freight handlers is that hung on rollers or pulleys at the top, with projecting door guides below the bottom of the door and wedge shaped pieces on the bottom of the door to fill guides when the door is closed. These doors always work well, even when bolts that hold pulleys to the door are loose or the door gets old or shaky. . . . Freight men are well satisfied with doors hung this way, and if made a few inches wider than the doorway, the lap over the door post at the back and the door stop in front make the necessary protection against sparks and rain."

New Lake Steamers.

At the Cleveland Ship Building Company's yard, April 20, was launched the steel steamer Chili, built to the order of Captain Drake, of Buffalo; Captain A. B. Wolvin, of Duluth; Wm. Dickinson, of Chicago; Captain David Vance, of Milwaukee, and others. The Chili measures 342 and 324 by 42 and 27 feet. Her engines are triple expansion, 20, 33 and 54 by 40 inches, the two boilers being 12 feet 4 inches by 13 feet. A 12 by 12 inch hoisting engine operates a fore and aft shafting, by which freight is lowered into and hoisted out of the hold. She will be ready for sea about June 1, and will carry 3,200 tons on 15 feet draught.

On the same day the steamer J. J. McWilliams, building at the Wheeler yard, West Bay City, was launched. She is building for the Mitchell-Gratwick syndicate, and is 370 feet over all, 352 between perpendiculars, 42 beam and 27 depth. Her engines are 20, 32 and 55 by 42 inches. Her boilers were made by Wicks Brothers, of Saginaw, and are 13½ by 12 feet. She is expected to be out in about four weeks.

The Detroit Dry Dock Company launched, April 20, at their Orleans Street yard, Detroit, a fine lumber steamer, the Argo, for C. R. Jones & Company, the Fisher-Wilson Lumber Company, and others, of Cleveland. She is a single decker, 203 feet in length, with 185 feet keel, 35½ feet beam and 15 feet depth, and will carry 800,000 feet of lumber on 12½ feet draught. Her engine is a fore and aft compound, 22 and 46 by 36 inches, with cylindrical boiler 12 feet 3 inches by 11 feet. She will carry two pole spars and one stack. She is expected to be out in three weeks and will tow two of the A. G. Comstock's barges.—Marine Record.

AN IMPROVED GASOLINE TRACTION ENGINE.

The illustration represents a gasoline traction engine which has been used in the field for several seasons, doing most efficient service. It is manufactured by the Charter Gas Engine Company, of Sterling, Ill. It is of neat design, strong and well built, the frame being all iron and steel, and the rear axle has roller bearings. The platform is suspended on springs. The steering wheel and levers are within easy reach of the operator, and the traction motion can be reversed instantly. The gearing is arranged to give two speeds, two and a half or four miles per hour.

THE "STERLING" GASOLINE TRACTION ENGINE.

The Prevention of Window Cleaning Accidents.

According to the report of the registrar-general, the number of fatal falls from the window in England alone is eighty per annum, but notwithstanding this fact, little has been done either on the part of the government or on the part of house owners to take means to lessen this unnecessary mortality. In 1892 the corporation of Glasgow passed a by-law enacting that in dwelling houses all window sashes above the ground floor should be hinged or constructed so as to admit of the outsides of the windows being cleaned from the inside of the apartment; and we believe that an old act, passed in 1847 and applying to English boroughs, made it an indictable offense to allow any one to stand outside a window, with a fine of 40s. payable by the occupier. But this act is undoubtedly a dead letter in the country, and would anyhow be impracticable in a large city like London. The proper remedy obviously lies in the fitting of the window itself. If this can be so constructed that the operation of cleaning can be performed from the inside, while the framework is both air and water tight, the safety of the cleaner is assured, but before any such innovation can become popular among those who have grown up among sashes and are returning to casements, it must be made clear that the new invention does not lose in comfort for its user what it may gain in safety for his servants. --The Lancet, London.

The Gateway to Lake Superior.

For many years the United States has had possession of the gateway to Lake Superior, for such may be termed the lock at the St. Mary's Falls Canal, and quite as much so as Gibraltar is the key to the Mediterranean.

It appears that Canada, or rather the imperial government, could not rest quietly under this state of affairs, which in a sense debarred access to their territory on the north shore of Lake Superior. This feature was brought strongly to the front a quarter of a century ago, when Canadian vessels with military supplies for Manitoba were refused permission to lock through the canal, which was then under the jurisdiction of the State of Michigan.

It may be assumed that from the above episode sprung the idea to have a national waterway whereby Dominion tonnage could pass on to Lake Superior under all conditions, and now this has been accomplished. Furthermore, it will be remembered that three seasons ago the Canadian government, by an order in council, so changed the rules governing the imposition of tolls in the Welland Canal, their gateway to the coast, that a rebate to the tolls would only be allowed to vessels that discharged their cargoes at a Canadian port. While the new order appeared all right and just on the face of it, there was really a strong discrimination against the port of Ogdensburg, N. Y., and as a consequence against American tonnage consigned there, and this meant the building up of Kingston, Ont., as a terminal lake point at the expense of Ogdensburg. Remonstrance on the part of commercial and transportation interests with the Dominion government proved futile, and finally a law was enacted by Congress exacting toll from all Canadian vessels passing to or from Lake Superior. This state of affairs lasted only about five months, when such pressure was brought to bear on the Dominion government that the order in council was abrogated relative to the Welland Canal tolls, and at the same time the American "Soo" Canal was again thrown open to the use of Canadian vessels free of all charges.

Canada is now independent regarding access to her Lake Superior ports. She has a splendid canal in her own territory and need not be under any further obligations to the United States for permission to reach her northern limits. In addition to this feature she holds the key to the coast via the St. Lawrence route, and with these facts in mind it has been a consideration for some time past to know whether the Welland Canal tolls would not be put in force again, seeing that the Dominion could no longer be checkmated by the United States in the same manner as formerly, and it is of particular interest to note that Canada seems to have no inclination at this time to reimpose burdens on American commerce, for not only is the new canal at Sault Ste. Marie declared free of tolls for all tonnage, but the Welland and St. Lawrence Canals remain as formerly relative to toll charges. This is the more magnanimous on the part of Canada considering that she has spent vastly more money, considering the meager population of the country, in improving natural and forming artificial waterways than has the United States, and the announcement that the Canadian St. Mary's Falls Canal is free to all vessels shows the spirit and feeling which the Dominion bears toward this country, for, of course, only American tonnage is meant when it is said that the canal is free to all.

Such concessions, or international courtesies, if so they may be called, will no doubt go far toward smoothing over rough places which crop up from time to time in the usual order of events, and questions involving international rulings are much easier settled in an amicable manner when a mutual feeling of friendliness predominates, and such must be regarded the recent action of Canada in throwing open the new Sault Ste. Marie Canal.—Marine Record.

THE average production of ice, by means of the expansion of cold air, in what are known as cold air ice machines, is two and one-half tons of ice per ton of coal. Other machines vary from two and one-half tons to twelve and one-half tons of ice per ton of coal.