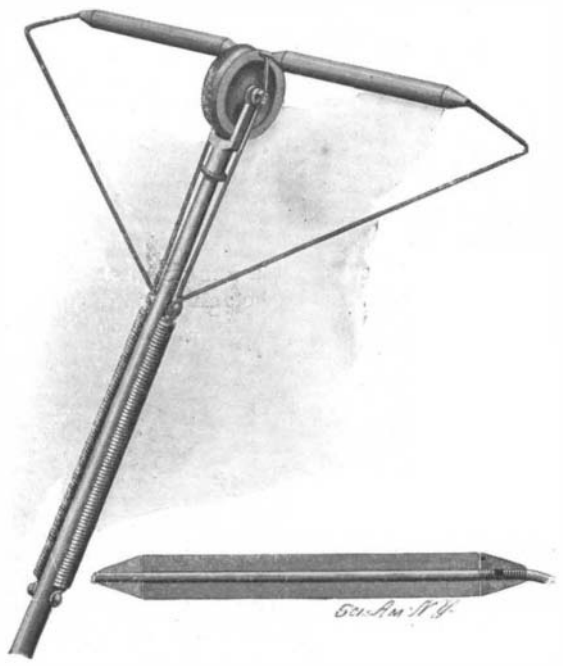
AN ATTACHMENT FOR TROLLEY POLES.

When an electric car rounds a curve, the trolley-pole often "jumps" the wire, thereby momentarily cutting out not only the motors, but also the lamp-current. In order to prevent this "jumping" of the trolley-pole, Mr. Willard P. Smith, of 56 Hudson Street, Manhattan, New York city, has devised the simple attachment shown in our illustrations.

At opposite sides of the trolley-pole guards are ar-



AN IMPROVED TROLLEY-POLE GUARD.

ranged, each comprising a vertical portion swinging on the trolley-bolt, a horizontal portion carrying a metal roller, and an inclined brace connecting the horizontal and vertical portions. An eye is formed at the lower end of each guard, which eye is connected with a coiled spring secured to the pole.

Should the trolley jump in turning a corner, the wire will come in contact with a roller, so that the motor and lamps will not be cut out. Should the wire run off the roller, the inclined brace will readily guide it back. The coil springs permit the guards to yield when the trolley runs off the wire.

A CONCRETE CHIMNEY.

BY RALPH C. DAVISON.

The increased use of concrete for building purposes has taken rapid strides within the last five or six years. No architect of the present day questions its durability. A series of experiments extending over a period of twenty years demonstrated that concrete grows harder as it grows older.

Thousands of dwellings have been built of concrete in England and Continental Europe. Of these, many, after more than half a century, prove their practical indestructibility.

A fine example of concrete work is that of the lighthouse at Port Said, which is 180 feet in height.

The reasons why this desirable material has not been more generally used are: First. The great compressive strength of concrete (the power to resist crushing) could not be utilized on account of its lack of tensional strength (the power to withstand a pulling strain). Second. Because there was a lack of efficient appliances for making and molding it.

The complete success of concrete construction to-day is due to the introduction of what is known as the "iron-concrete construction," or reinforced concrete. The basis of this system is a combination of iron and concrete; the iron is embedded in the concrete in such a manner as to give the concrete all the tensional strength of the iron, and at the same time to fully utilize the immense compressive strength inherent in the concrete.

The tensional strength of the steel or iron, which is about 30 tons to the square inch, increases the strength of the concrete about one hundred fold. Many different forms of iron are used in concrete construction, such as iron net, square iron bars, twisted iron bars, etc.

Concrete-iron construction is universal in its application, covering the entire field now occupied by stone, brick, and terra cotta, such as stairs, foundations, walls, floors, fortifications, sidewalks, etc.

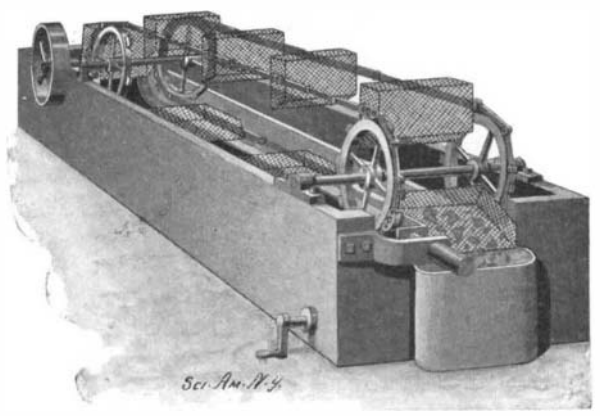
The advantages derived from using concrete are not only simplicity in construction, but the fire-resisting qualities of concrete are far superior to those of any other building material now in use.

A new departure in concrete construction is that of chimney-building. A concrete chimney has just been completed for the Singer Manufacturing Company at Elizabethport, N. J. This chimney is of the Ransom cold-twisted-iron construction, and is the second of its kind in this country; the first, a chimney 150 feet high, with walls less than 12 inches thick, was built about three years ago at Bayonne, N. J., for the Pacific Coast Borax Company. This chimney has given perfect satisfaction and has withstood a number of severe wind storms. All the buildings of this company are of concrete throughout. The Singer chimney is a straight chimney 125 feet high, with a 9-foot flue. It weighs 250 tons, the load on the base being 9½ tons to the square foot; 20 pounds per foot was allowed for wind pressure in designing the chimney. What is known by concrete men as "wet" concrete was used. By a wet mixture is meant one which quakes slightly when rammed; by dry mixture is meant one which requires repeated ramming to bring water to the surface. The concrete was mixed according to the following proportions: 1 part American Portland cement, 3 parts sand, 5 parts broken Hudson River limestone. (Stone broken to pass through a ¾-inch ring unscreened.) All of the concrete used was machine mixed, this process being much quicker and cheaper than mixing by hand. The method used in constructing this style of chimney is ingenious and novel, and is covered by patents. In laying the foundation for this chimney no piles were used; the ground was simply leveled off and the concrete laid as shown in Fig. 1. Cold-twisted iron bars were embedded in the foundation, radiating from the center, as shown. Twisted rectangular bars are used for the reason that the spiral ribs formed upon the iron make a continuous lock between the bars and the concrete. It was also shown by test that the tensile strength of twisted bars was considerably more than bars that were not twisted. The following table shows the increase of

Material.	No. of twists per foot.	Per cent of gain.	No. of twists per foot.	Per cent. of gain.
¾ inch square commercial iron	⅜	0.03	¾	0.05
" " " "	1½	0.17	2¼	0.18
" " " "	3¾	0.20	6	0.24
¾ " " Norway "	....	....	6	0.53

strength of iron bars by reason of twisting. When the foundation is thoroughly set, a mold is put in place and the actual building of the chimney commences. This mold is constructed as shown in Fig. 2. It is filled with concrete, through which iron bars are distributed as shown in Fig. 1. This concrete is then thoroughly tamped and allowed to set. It will be noticed that the chimney has an inner and outer shell; the space between these shells is obtained by means of wooden core blocks. Scaffolding is erected inside of the mold; on this scaffolding the hoisting beams, *A*, shown in Fig. 2, are supported.

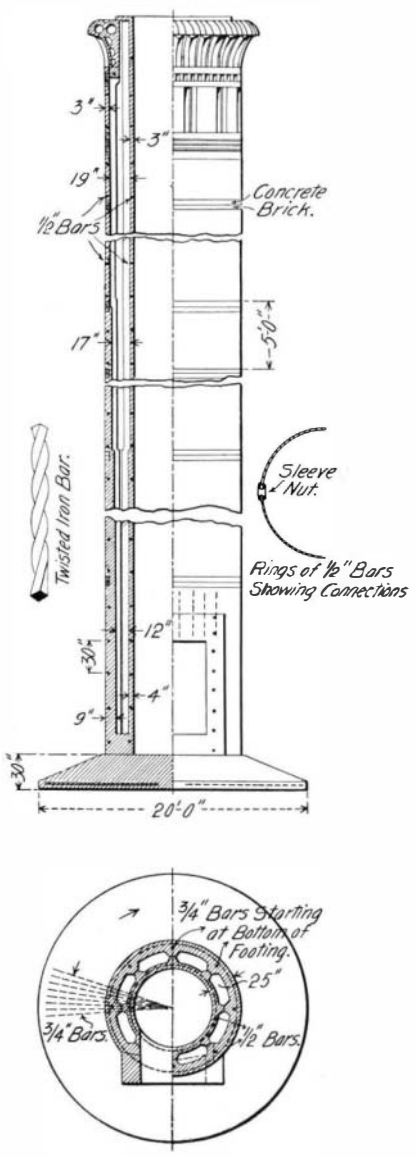
After the first filling of concrete in the mold is thoroughly set, the turnbuckles on the mold are let out, leaving the mold free to be raised by means of the threaded stays and hand wheels. Eight men are required to raise the mold, one man at each wheel. The mold is raised 5 feet at a time, this leaving the mold a lap of 7 feet on the portion of the chimney already set. The mold is now tightened up by means of the turnbuckles, and is again filled with concrete



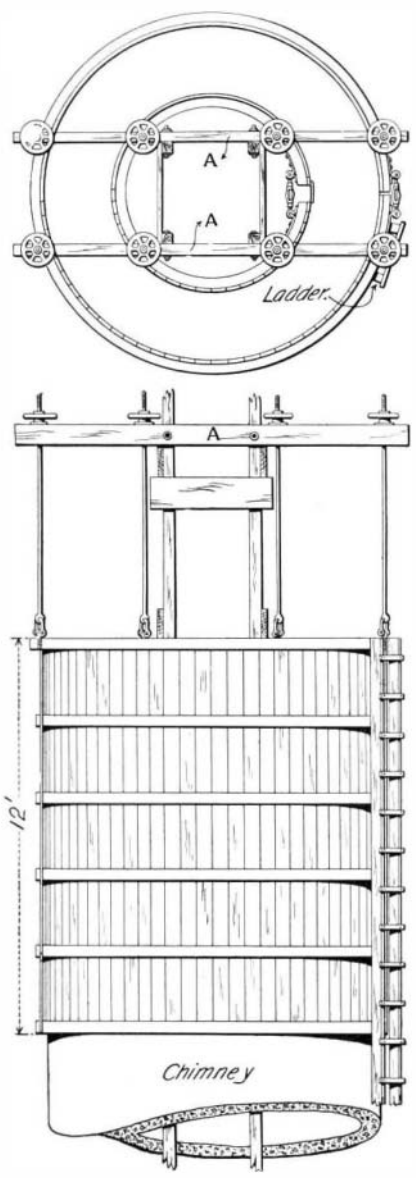
A NEW ICE CONVEYING APPARATUS.

and iron rings. Perpendicular iron rods are also placed through the chimney, as shown in Fig. 1. These are joined at every filling, making a series of continuous bars from the base to the top of the chimney. The operation is continued each succeeding day, the scaffolding being extended upward, and the mold raised, filled and the concrete allowed to set; thus 5 feet of the chimney is completed each day. When the mold is raised high enough to clear the cleaning-out door, the concrete is delivered to the men on the scaffolding by means of a bucket-hoist inside of the mold. In molding the cap, a plaster mold is used.

The outside finish of these chimneys may be left plain, or tooled to represent stone; sometimes, to add to a chimney's appearance, two rows of concrete brick are laid in place after each day's work, this making a series of brick rings 5 feet apart throughout the height of the chimney. When lightning rods are desired, the perpendicular rods already referred to are extended up through the cap.



DETAILS OF CONCRETE CHIMNEY AT ELIZABETHPORT, N. J.



PLAN AND ELEVATION OF THE MOLD.

A NEW ICE-CONVEYING APPARATUS

In regeling ice-machines, the ice-particles or chips are turned off from the freezing cylinder and are considered cold enough to freeze together when collected and compressed.

Usually the ice-particles, however, are greatly agitated in the water before being discharged into the suction-pipe or solidifying device, and their temperature becomes too nearly that of the water, so that in a completed cake of ice some films of water sink down, drawing in air, and marring the appearance of the cake. To overcome these objections and to provide an improved means for collecting and discharging the ice-particles with least agitation, so that the final cake will be more thoroughly frozen and solidified, is the purpose of an invention patented by Ambrose H. Rauch, of Bethlehem, Penn.

In the freezing-tank which forms part of the apparatus for making ice by the regealing method, and from which chips or particles of floating ice are discharged into a suction-pipe leading to a slush-pump, Mr. Rauch mounts a skimming mechanism. The essential features of this mechanism are scoops mounted to swing on two endless carrier-chains passing over sprocket-wheels. Each scoop consists of a metal frame with bottom, back and sides of screen material through which the water may pass freely.

The scoops pass down between the one set of sprockets in a vertical position, and, while moving through the water in the tank, are turned to a horizontal position to gather up the ice-particles, by means of guide-rails.

At the outlet end of the tank is a spring-actuated hammer designed to be engaged by a scoop, or by one of its trunnions, when the scoop is about to discharge its load. The trunnion of a scoop gradually compresses the spring of the hammer until the scoop is about to discharge its contents. Then, when released, the upper short portion of the hammer strikes the trunnion, thus jarring the ice-particles into the pipe.