

SCIENTIFIC AMERICAN

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WEEKLY.

THE MANUFACTURE OF WIRE GLASS AT TACONY, PHILADELPHIA, PA.

The subject of protecting glazed skylights is one which of late years has acquired additional importance. The construction of large railroad depots illustrates the tendency of the day. In such structures as the Grand Central Depot in this city, light is given to the interior by large skylights. These are placed in the roof of the building and are of very large area. At a height of nearly a hundred feet above the floor they are a constant menace to life. The glass used in their construction is necessarily of considerable thickness. If it breaks and falls, the heavy sharp-edged pieces are perfectly capable of inflicting a fatal blow. If a piece were to fall upon a car roof it would very probably cut its way through, and embed itself in the bottom of the car if it did not go through that also. The force of the blow of course depends on the size of the piece. Some extraordinary accounts have been given of the penetrative power of glass which has actually fallen from such a skylight.

To prevent accidents of this kind a copper wire network is often stretched over the framework of the skylight directly under the glass, or in some equivalent position, with a view of catching any pieces which may be detached or broken loose. This is a partial solution of the difficulty only. The wire gauze is liable to cor-

rode, or its fastenings may become loosened, so that it may be quite useless. Corrosion is especially to be feared in railroad stations and train sheds. The gases from the locomotive smokestacks is a source of corrosion, as the sulphurous fumes attack both copper and iron. In such situations also it is found that large sheets of glass tend to crack.

We illustrate an experimental plant for the production of wire glass, a substance designed to overcome these difficulties. The product consists of rolled glass, with iron wire netting embedded in its own substance. Thus the wire is hermetically inclosed, and is secure from corrosion for any length of time. The machine and process is the invention of Mr. Frank Shumann, of Philadelphia, Pa. At the works illustrated in our cut, as much as ten tons of the material was produced. The glass made under the conditions incident to experimental appliances was so perfect, and of such obvious merit, that it obtained the fullest appreciation from the architects and engineers of the country. Work is now in active progress on extensive plant and buildings for the production of the new material in commercial quantities.

The general principle of operation is as follows:

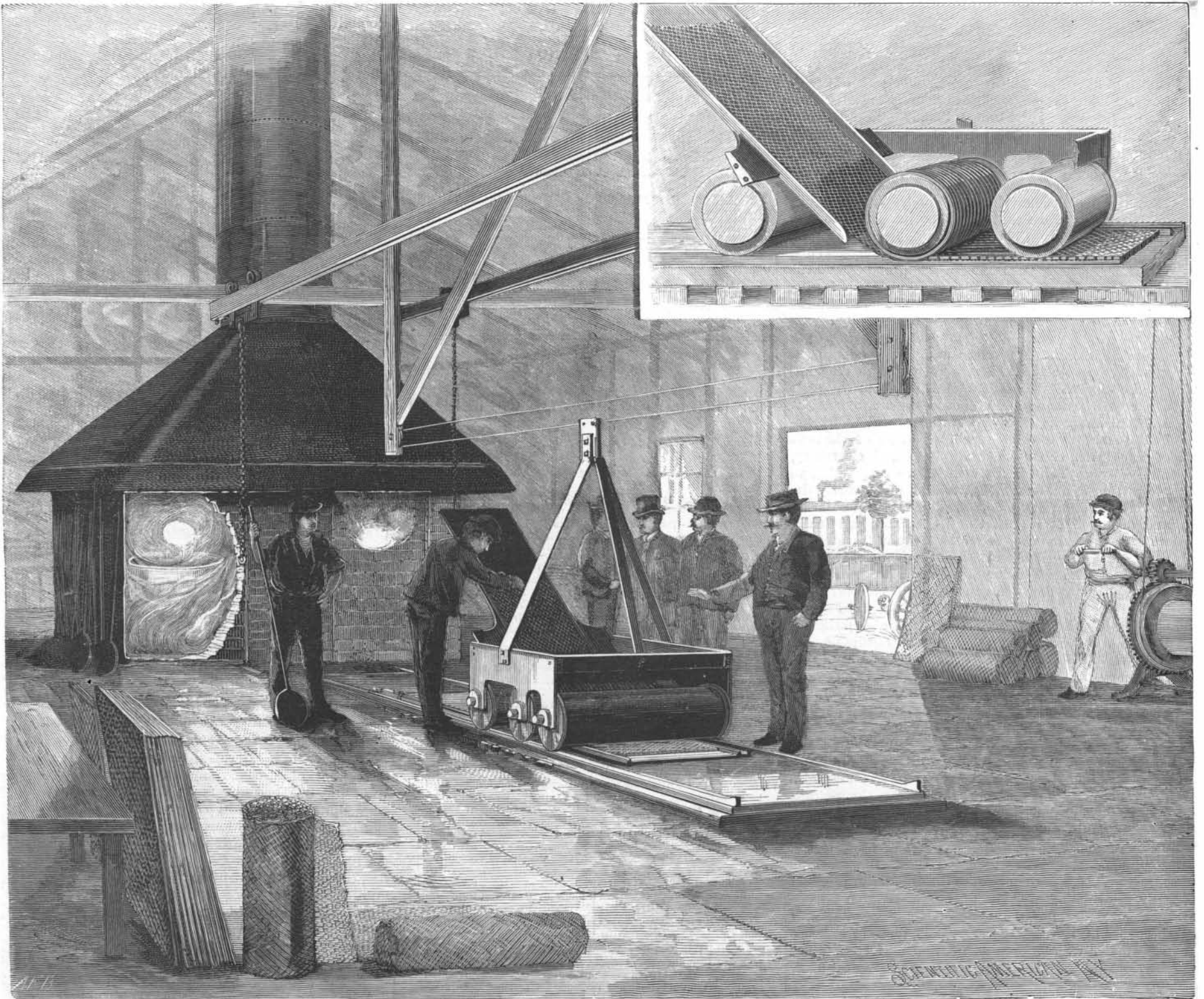
A glass rolling table with side ledges is provided. A three-roller carriage moves over it, running on the side ledges. The glass is rolled out upon this table, the

ledges regulating its thickness. Two of the rollers are smooth; the central roller has a series of grooves running around it. Between the leading roller and the corrugated roller a slide is placed for the reception of a sheet of wire gauze. Arrangements are provided for traversing the rollers from end to end of the table.

The rollers are hollow, and, in the experimental plant, red hot iron cores are introduced in them to heat them.

The glass has been melted in an adjacent furnace. The sheet of wire gauze is heated, and all is ready for the rolling. A proper quantity of melted glass is poured out upon the table, the hot sheet of wire gauze is placed in its carrier, and the roller carriage is started. As the carriage progresses a little, the wire is dropped. The first roller has rolled out the glass. The wire gauze strikes the partly fluid glass, and is drawn under the corrugated roller. This seizes it, and by its corrugations forces it into the pasty glass to the required depth. The compound mass then goes under the third roller, where it is rolled smooth, and the operation is completed. The sheet is now annealed in the usual way, and is ready for use.

By modifications in the apparatus various products may be obtained. The wire gauze may be heated so hot as to receive a corrugated contour, which it retains in the glass. It may on the other hand be worked at



THE MANUFACTURE OF WIRE GLASS AT TACONY, PHILADELPHIA, PA.

so low a temperature as to lie quite flat in the finished product. The corrugated roller may be adjusted to give it any desired depth in the glass.

Sheets of wire glass six feet long, two feet wide and three-eighths of an inch thick have been rolled at the experimental plant in thirty-five seconds.

The American Wire Glass Co., of Tacony, Philadelphia, Pa., has been formed to exploit this invention. By the beginning of next year they expect to have in active operation their factory already alluded to, with a daily capacity of about 5,000 square feet of wire glass.

The new product has other uses than those mentioned. It is to some extent burglar proof. It is not known what is the heaviest wire which can be used, but it is obvious that glass several inches thick with one or two sheets of heavy steel wire gauze embedded in its center would be very resistant to any attacks by burglars.

Science in Medicine.

The recent address at St. George's, London, was delivered by Dr. Bowles, of Folkestone. The lecturer commenced by welcoming the new students, and urging them all to preserve the tradition that "a St. George's man is expected at all times and under all circumstances to be a gentleman."

Surgery is a department of physics—a physical art. Medicine, formerly the region of the unknown and the happy hunting ground of quacks, is rapidly following in the same lines. The so-called practical man and the believer in dogmas and nostrums are rapidly giving way to minds trained in the laws of physics.

The lecturer then reviewed the rapid progress made in late years in the studies on which the medical art is based. Schroeder in Germany and Pasteur in France, by their investigations on fermentation and putrefaction, and Chauveau on the particular nature of contagia, have opened up an entirely new world.

PROFESSOR C. A. YOUNG announces that the fifth satellite of Jupiter has been seen by his assistant, Mr. Reed, with the 23 inch equatorial, at Princeton.

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NEW YORK AND BROOKLYN BRIDGE CABLE RAILWAY OPERATIONS DURING THE WEEK OF THE COLUMBUS FESTIVAL.

Never was the bridge so crowded with people as during the gala days of the Columbian anniversary. Commencing on Sunday, October 9, 453 trains were dispatched, 392 of which had a headway of from 3 to 2 minutes.

On Monday 549 trains were dispatched, 120 of which had but 1½ minutes' headway. Tuesday, 558 trains, 212 at 1½ minutes' headway. Wednesday, the rush day, 697 trains were dispatched, of which 346 were on 1½ minutes' headway. The number of passengers carried was, on Sunday 99,309, Monday 188,677, Tuesday 158,085, and on Wednesday 223,625, gradually falling off to the normal number at the end of the week. The whole number for the week was 1,091,539. The greatest rush was from Wednesday, 8:15 A. M., until Thursday, 8:15 A. M., 24 hours' continuous run of the cars carrying 258,593 passengers.

The speed of the cable is 10½ miles per hour; it is 1½ inches diameter, and 12,000 feet long. It wears out in about 15 months, having a haulage service of about 20,000,000 ton miles. The greatest recorded work of the cable engines is 1,093 horse power. Cars weigh from 17 to 19 tons, and there are 60 in service, 48 running during rush hours. The above enumeration only includes railway passengers riding by ticket. The immense throng by the foot and roadway can only be estimated, and probably reached the number of 200,000 or more, making the total travel over the bridge on Wednesday, October 12, nearly half a million people. Not the slightest accident is known to have occurred. When we consider that one-half of the immense train service of Wednesday was run on 1½ minutes' headway, without a break, we cannot but accord the highest praise to its management.

PHOTOGRAPHY AT THE WORLD'S FAIR.

When the question of granting photographers the right to photograph, for a small fee, at the World's Fair grounds was submitted to the Ways and Means Committee last spring, it was announced that no such privilege would be permitted, as it would interfere with the parties who might secure the sole right to photograph, from whom large payments were expected.

As soon as this announcement was made, a movement was inaugurated by the editor of the American Amateur Photographer to obtain the sentiments of the various photographic clubs and societies on the proposition to exclude the camera of the amateur photographer, which resulted in nearly every organization disapproving the idea and urging the authorities, through special petitions, to reconsider their decision, on the ground that more money would be raised by admitting the camera at a small fee than could be derived by restricting the privilege to a few at a higher charge.

We are gratified to be able to state that the desires of the amateur photographers have been substantially acceded to. It was officially announced on the 25th of October by the official photographer of the World's Columbian Exposition, Mr. C. D. Arnold, that on and after that date "Hand cameras using plates up to and including 4 x 5 inches, without tripods, will be allowed within the grounds of the World's Columbian Exposition, on payment of a fee of two dollars in addition to the regular price of admission for each day. Cameras using stereoscopic lenses will not be admitted, however small the plate may be."

This decision practically opens the grounds to photographers and will enable those desiring to secure photographs for themselves from their own point of view to do so. It is we think very creditable to the World's Fair authorities that they have decided to grant some concessions to the amateur photographers, and will undoubtedly be the means of greatly increasing the amount of free advertising the fair will get, while the manufacturers and dealers in photographic materials will also greatly profit by the increased demand for their goods.

Photographing the Sound of Vowels.

At the recent International Congress of Physiology at Liege, Professor Hermann demonstrated his method of photographing the sound of vowels. The vowels were sung out before one of Edison's phonographs. Immediately afterward they were reproduced very slowly, and the vibrations recorded by a microphone. The latter was furnished with a mirror, which reflected the light of an electric lamp upon a registering cylinder, covered with sensitized paper and protected by another cylinder with a small opening which gave passage to the rays of light from the reflector. By this means was obtained very distinct photographic traces, and the constancy was remarkable for the different letters.

A MINE ON FIRE SINCE 1858.—The burning mine at Summit Hill, near Mauch Chunk, Pa., has been on fire since 1858.