NEW FIRE BOAT FOR NEW YORK CITY—THE NEW YORKER.

The most important of recent additions to the apparatus of the New York Fire Department is what is termed the floating fire engine, the New Yorker. The new "fire engine" is a boat built of iron and steel, provided with powerful engines for propulsion, and with duplicate boilers and duplicate pumping plant for the extinguishment of fires. When the capacity of the pumps and general perfection of the design together with the applicability of the boat for delivering heavy streams of water many blocks in from the water front is considered, it will appear that it is a most valuable auxiliary for the protection of the city.

The boat and machinery are built of iron and steel throughout, under full specifications furnished by the department. The length over all is 125 ft. 5 in.; on load water line, 115 feet. The beam moulded is 26 ft.; on load water line, 25 ft. 2 in. The depth moulded is 14 ft. 6 in., and the extreme draught is 10 ft. The displacement is 351 tons. At the load water line the displacement is 52 tons to the inch.

The hull is laid upon a keel of bar iron 6 in. wide by 2¼ in. thick. The frames, spaced 20 in. from center to center, are steel angle iron 3 by 2½ by $\frac{6}{16}$ in. for three-fifths of the center of the hull, and 3 by 2½ by $\frac{5}{16}$ at the ends. Each side of a frame is in one piece, scarfs being prohibited.

The plating of the sides is laid "in and out," with thick strakes out. The garboard and sheer strakes (extreme upper and lower rows of plating) are 30 in. wide and ½ in. thick. The intermediate strakes are $\frac{7}{16}$ and $\frac{6}{16}$ thick respectively. The plates are all of steel.

For the woodwork, where such is introduced, white oak and locust are generally used, except for the deck and joiner work. The deck is of 3 in. white pine, and laid with the greatest care. Wherever cleats come, a white oak bed is laid for them, and white oak partners surround the bitts.

The bilges are coated with not less than one-half inch of Portland cement. This is brought up to the level of the limber holes, through which the bilge water finds its way to the pump well. Thus no water can lie stagnant between the frames.

For the iron an elongation of 20 per cent and tensile strength of 45,000 pounds, with 41,000 across the grain, and for the steel an elongation of 22 per cent with a tensile strength between 55,000 and 65,000 pounds per square inch, were prescribed.

The deck house is much lower than on other boats of this general class, rising only three feet above the deck. It is built of iron frames and plates. The pilot house rises 8 feet 9 inches from the top of the deck house (trunk deck) and is 15 feet long and 15 feet 9 inches wide, with 7 feet height of ceiling.

The boilers, two in number, are of the "Scotch" type, cylindrical, with corrugated furnaces. They are built for a working pressure of 148 pounds. Each is 12 feet diameter and 15 feet long, with 204 tubes of 3¼ inches outside diameter. The outside sheets are thirteen-sixteenths inch thick, and other portions of reduced thickness. Artificial draught is provided, and the boilers can be worked together or independently.

The propelling engine is of the triple expansion direct inverted type, 24 inches stroke, with 15, 24, and 39 inch cylinders. The high pressure cylinder has a piston valve, the others have slide valves. It can work up to 135 revolutions per minute with 135 to 150 pounds boiler pressure.

The propellers are two in number. The fixed or forward screw is 7 feet 9 inches diameter by 12 feet pitch. Back of this comes the "Kunstadter" swiveling screw and gear. This is connected by a universal joint to the shaft, which joint comes in line with the axis of rotation of the rudder. Thus the screw is swung to right or left with the rudder and aids in maneuvering the boat. It has been found highly efficient.

One independent air pump and a circulating pump for the condenser is provided. The condenser is of the tubular pattern, with about 2,000 square feet of condensing surface. Steam steering gear and engine are provided in addition to the regular hand steering apparatus.

For signaling, a steam chime whistle and a steam calliope are provided.

The pumping machinery is of great power. It comprises two duplex vertical direct-acting pumps. Each has two steam and two water cylinders. The steam cylinders are 16 inches diameter by 11 inches stroke. The water cylinders of the same stroke are of 10 inches diameter. The working pressure allowed for the water cylinders is 200 lb. to the square inch.

The pumps draw water in through two 16 inch suction openings in the bottom of the vessel, to which suction pipes are connected. The discharge is delivered through 9½ inch connections into a 12 inch main, that runs around the trunk or deck house, and which is provided with numerous connections for hose couplings. Several 12 inch valves are placed in the circuit, so as to shut off any desired portion. The line is provided with a number of 3½ and 6 inch hose couplings. Four 7 inch hand pipes are also carried upward, two to the roof of the pilot house and two aft through the trunk. These are surmounted by swivel nozzles adapted for throwing 5½ inch streams if desired. A fifth swivel nozzle is mounted on the bitts forward, and connects by hose with one of the large connections. Altogether thirty-two discharges are provided for.

The hand pipes are manipulated from behind traveling screens, made of double sheet steel with one inch air space, perforated for hose pipes, and with peep holes. These can be moved fore and aft to any desired point along the rail, and protect the firemen. There are three of these on each side. They are carried on rollers, which work upon the rail and upon the plank sheer with guides. Any screen can be lifted off its bearings and carried to the other side of the deck. Movable fire screens are provided for windows, which screens are kept stored away when not in use. Those for the pilot house windows have peep holes.

As an additional protection four spray pipes are carried up along the front of the pilot house and elsewhere, with cap and hose connection at the top. The object of these is to distribute water in a spray or rain-like form over the deck of the boat. In this way the hose is protected in situations where the heat is great.

Upon the trunk deck are two swiveling hose reels on which the hose is kept. Of this there are 3,000 feet, ranging in size from 2½ inches to 6 inches diameter. A great variety of nozzles or discharge pipes are provided, of about every size from 2½ inches up to 5½ inches diameter.

The capacity of discharge is put at 10,000 gallons per minute, with the pumps making 200 revolutions.

In connection with the boat a tender is kept on land. When the boat answers an alarm the tender meets it at the dock. This tender carries 1500 feet of 3¼ inch hose. Thus, a fire half a mile inland from the river front can be supplied with water in case the supply of city water is deficient.

As the boat lies at the dock, fifty pounds of steam is maintained in one boiler, and the fires in the other are kept ready for lighting. On an alarm from its district being received, the lines are cast off, the artificial draught is started, and the boat is at once under way.

No official trial of the boat has yet been made. On an unofficial trial the speed was found to be high, or about 15 knots. A 5-inch stream of water was thrown about 250 feet. The full record of her capacity, engine power, etc., has yet to be made up.

The hull was built by Jonson & Ellison, of this city; the engines by Brown & Miller, of Jersey City, N. J.; the boilers by McNeil & McLoughlin, of Brooklyn, N. Y. One set of pumps was built by the La France Fire Engine Company, of Elmira, N. Y.; the other by the Clapp & Jones Manufacturing Company, of Hudson, N. Y.

The total cost is put at $100,000. A district extending from Twenty-third Street, on the Hudson River, to Grand Street, on the East River, is assigned to its protection. There are sleeping accommodations in forecastle and aft cabin. It is proposed, ultimately, to have quarters on the dock for some of the men to sleep in.

Our thanks are due to Chief Hugh Bonner, of the New York Fire Department, for information concerning the boat.

Crystalline Glass.

NICHOLAUS T. NELSON.

Few trade secrets have been kept so well from the knowledge of the general public as the process of producing the above mentioned species of decorative glass. It is said to be the invention of a French engineer, who called it "vierre gievre," or frozen glass. In the United States, where its manufacture has been brought to a much greater state of perfection than in any other country, it is known under the more common names of chipped or crystalline glass, and the operation of manufacture "glass chipping." It has a remarkable appearance, being covered with fern-like figures, no two of which exactly resemble each other, differing in both shape and form. To those unacquainted with the method of producing this glass—and there are very few that have any conception of how it is made—the process of manufacturing is very puzzling.

This method of ornamenting glass is so simple that most people, when they have it first explained to them, will hardly believe that such simple means can produce such marvelous results. It is done by covering glass with glue, which adheres to the glass, and when the glue dries it shrinks and draws with it pieces of the glass or chips of glass.

The first necessity in carrying out this process is to have the glass which is to be ornamented ground either by means of the sand blast or by the more troublesome means of grinding by hand. This is done by rubbing a stone with a flat side over the glass till it has lost its polish and become translucent. A thin layer of emery kept wet with water will facilitate the grinding, which should be as coarse as possible, and for which reason grinding done by the sand blast is preferable.

After the glass has been ground it should be kept scrupulously clean. Great care should be exercised that the surface is not touched by the hands. Any trace of grease is very apt to make the results uncertain. If the glass has, however, become contaminated, it may be cleaned with very strong ammonia, although glass which it has been necessary to clean is apt to be rather unreliable.

When everything is ready the glass is placed in a room where it is intended to carry on the process, accurately leveled, and flowed with a solution made as follows:

Good glue is placed in sufficient water to cover it and allowed to soak for twenty-four hours. If the water is absorbed during the soaking, more may be added. It is then liquefied over a water bath and is then ready to use.

In practice it makes considerable difference which kind of glue is used. By repeated experiments it has been found that Irish glue is the best for the purpose.

A wide brush is dipped in the glue and applied to the glass. The coating should be a thick one, otherwise it will not be strong enough to do the work required. When the plates are coated they may be placed in racks, and the temperature of the room raised to 95 or 100 degrees F. They are permitted to remain at this temperature till they are perfectly dry, which will be in from ten to twenty hours.

It is at this stage that the uncertain character of glue shows itself. Under certain circumstances the glue will begin to crack and rise of itself without any more manipulations, but most generally it will require to have a stream of cold air suddenly strike it. If the plate is perfectly dry at this period, and of sufficient thickness, the top surface of the glass will be torn off with a noise resembling the crack of a toy pistol. Sometimes the pieces of glue will leap two or three inches into the air, and may even fly into the eyes and injure them. To guard against this it is customary for the workmen to wear a pair of spectacles fitted with plain glass. The glue will come off sometimes at the least expected times, notably if the plate with dried glue is being carried from one room to another. Plates which have shown a decided disinclination to chip have manifested a remarkable and unexpected activity and have jumped into the face of the person carrying them in such a manner as to cause him to drop them.

The strength of the glue is something very extraordinary. If the glass has been coated on the hollow or belly side of the glass, the slight leverage thus obtained is almost sure to break it, especially if the glass be single strength. Even plate glass is not unfrequently broken. It might be a rather interesting mathematical calculation to find out the force necessary to separate the surface of glass in this manner on a piece say 48 by 48 inches.

The result of the operation described may be various. It may be either a design resembling ferns of various shapes and sizes, or it may be a circular design, exhibiting narrow, feathery appearances; or, if unsuitable glue has been used, it may be of a nondescript appearance.

If, after the glue has been applied, but before it has become any more than set, a piece of stout paper is pressed over it and it is allowed to dry in this way, the glass will have less the appearance of feathers, but will be much coarser and larger pieces will be removed.

The circular design mentioned occurs under the same circumstances as the other, with the exception that it generally is made during cold weather. Sometimes several weeks may run along and nothing but this formation be made.

Some very elegant designs may be produced by submitting the glass once more to the same operation, covering it as before and allowing the glue to chip. This is known by the name of double chip. If the glass was covered with the small circles in the first place, the second time it will have an appearance very much resembling shells, and for this reason this has been called shell chip.

If, instead of using ordinary glass, colored glass is employed, pretty and original effects may be obtained. The glass may be either colored clear through or it may have only a thin coating on one side. In the latter case in some places the entire layer of colored glass will be removed, and in other places only a very little, and will therefore give all the gradations between those two extremes.

Glass which has been treated in this way may be silvered and gilded and thereby be made still more remarkable in appearance.

Extremely elegant effects may be obtained by what is known as "chipping to a line." The design is ground in the glass by the ordinary sand blast process. After the glass has passed through the machine, the protective coating (wax is generally used) is not removed, but is left on to keep the glue off those parts which are not intended to chip. The glue is then applied in a thick layer to the ground portion and the process is carried on as usual.

A Simple and Excellent Furniture Polish.

One part by measure of olive oil and two parts of vinegar. Shake well together and apply with a woolen cloth, after which take a dry woolen cloth and rub vigorously. A housewife who uses this says it is a first rate, reliable furniture polish, always to be depended upon for giving most satisfactory results.