

**MOVING THE BRIGHTON BEACH HOTEL.**

We illustrate in our present issue the moving of the Brighton Beach Hotel, one of the great buildings of Coney Island, near this city. For many months there has been a marked tendency on the part of the water to wear away the sandy beach upon which the building was erected. During the past winter this tendency increased, and assumed alarming proportions. It is possible that the erection of protecting bulkheads on the neighboring property had the effect of creating a scouring action on the part of the waves and currents. Whatever the cause, during the past fall and winter months the sea advanced. The music stand, once safely on the beach between the ocean and the hotel, was surrounded by water, and remained supported by piling a few feet above the tide. The water still encroached, and soon made its way under the hotel, and it was evident that unless some preventive measures were taken, the house would be undermined, and carried away.

An adjoining building, of much smaller size, called the pavilion, had already been moved several times as the waters advanced. Small as it was, compared with the hotel, it had been moved in three pieces, having been cut into sections for the purpose. After this experience the most natural idea was to attack the problem of dealing with the great hotel upon a similar basis. It was proposed to saw it into a number of sections, and to move it back piecemeal. The cost of the operation deterred the managers from attempting it.

The hotel is owned by the Brooklyn, Flatbush, and Coney Island Railroad Company. The superintendent of the road, Mr. J. L. Morrow, and the secretary, Mr. E. L. Langford, in discussing the matter, originated the highly ingenious and novel plan which was adopted. Its execution was confided to Mr. Morrow. The plan was to place the hotel upon a number of freight cars, resting on parallel tracks, and to draw it where wanted by locomotives. The nearest approach to such a method is to be found in the Eads ship railroad, and the moving of the gigantic hotel is a happy augury for the success of the other project.

The building is a wooden structure four hundred and sixty-five feet long, one hundred and fifty feet deep, and three stories high, as regards its main portions. Five towers rise from the roof. Its longer front faces the sea. It had to be moved backward in the direction of its shorter axis. The estimated weight of the structure was five thousand tons. From one hundred to one hundred and fifty tons of plaster were contained within it. It rested upon a series of short posts which, in their turn, were supported by piling.

The first operation was to lay a series of parallel tracks from underneath the building. Longitudinal planks two inches in thickness were placed in the lines where the rails were to run. Upon these the cross ties, or sleepers, were placed, and sand was eventually rammed under the planks and sleepers alike. This gave the sleepers a double support, directly from the earth and also from the stringer planks. The rails were of the ordinary type, weighing fifty-six and sixty pounds to the yard. They were laid with a four foot nine inch gauge rod, and rather freely, so that their gauge was probably five-eighths of an inch more than the normal. The idea of this was to provide for any lateral play that might be necessary. Twenty-four lines of track were laid, and were carried under the building and out from it about three hundred feet landward. To lay track for moving the building its own depth, a mile and a half of rails were required. Ten thousand ties were used.

One hundred and twelve platform cars were hired for carrying the building. They were supplied by the Iron Car Co. Their brake wheels were removed and stowed, each pair under their own car. The building

was next attacked in twenty foot sections, and jacked up.

One 90 ton, three 60 ton, five 30 ton, and four 10 ton hydraulic jacks were used. The sills were raised from the supporting posts and the cars were rolled under, carrying with them transverse timbers of 12x14 yellow pine. Each piece rested upon two cars on adjacent tracks, the longest timber being only forty-one feet long. One hundred and ten thousand feet of this timber was required. As far as possible the timbers were made to bear upon the central axis of the car, and over the trucks. The house was raised enough to permit the cars and timbers to go under it, but one or two inches clearance being allowed for. In one place the building had settled nearly a foot. This was straightened up. The cars on each track were coupled together, and then were jacked apart so as to pull out the drawheads to their fullest extent. The weight of the building lowered upon the cars kept them in this position. In some cases this jacking apart was omitted. Such cars were connected by rope slings twisted so as to rigidly hold them together. The idea was to prevent any separation or alteration of the longitudinal distance between cars. No system of diagonal bracing was used, the utmost simplicity characterizing the arrangement.

In sections of twenty feet the whole building was gradually placed upon the cars. It is believed that the strain upon some of them cannot have been less than seventy-five tons, yet nothing has given away, although the springs were strongly compressed, so that the bolsters were nearly in contact.

A number of heavy blocks and falls were now connected to the front ends of the twenty-four lines of

tion. The work now had to stop as far as moving the building was concerned, because the rails were not laid any further and because the piling for the new foundation was not all driven. The rails, sleepers, and stringers left between the house and the water were transferred to the front, and a way provided for the hotel to move the rest of its journey to its new resting place, four hundred and ninety-five feet from its original location.

No difficulty of any kind was encountered. Want of power had been the principal thing that was feared, but four locomotives proved enough to carry the house along at the rate of a fast walk. The engines were found to work admirably in producing an absolute and definite pull. Windlasses or capstans might have been used, but Mr. Morrow felt that they were inferior to the engines, because of the tendency of the rope to slip upon the drum. The total weight moved was placed at one thousand tons for the cars and five thousand for the building. This represents the weight of about one and a half miles of loaded coal cars, or of a large ocean steamer.

Reference has already been made to the Eads ship railroad. In the moving of the great hotel, a far more difficult task than that called for in the operation of the ship railway was accomplished. Instead of a ship, compact and strongly built to resist every kind of strain, a large house, of relatively little intrinsic strength, was dealt with. A little settling or inequality of movement would have wrecked it. As regards power, light locomotives only were used. Compared with an iron, or even wooden, ship, the hotel might be pronounced a house of cards. The confidence in the

Eads scheme cannot but be largely increased by this feat in engineering.

**Boston Hot Water.**

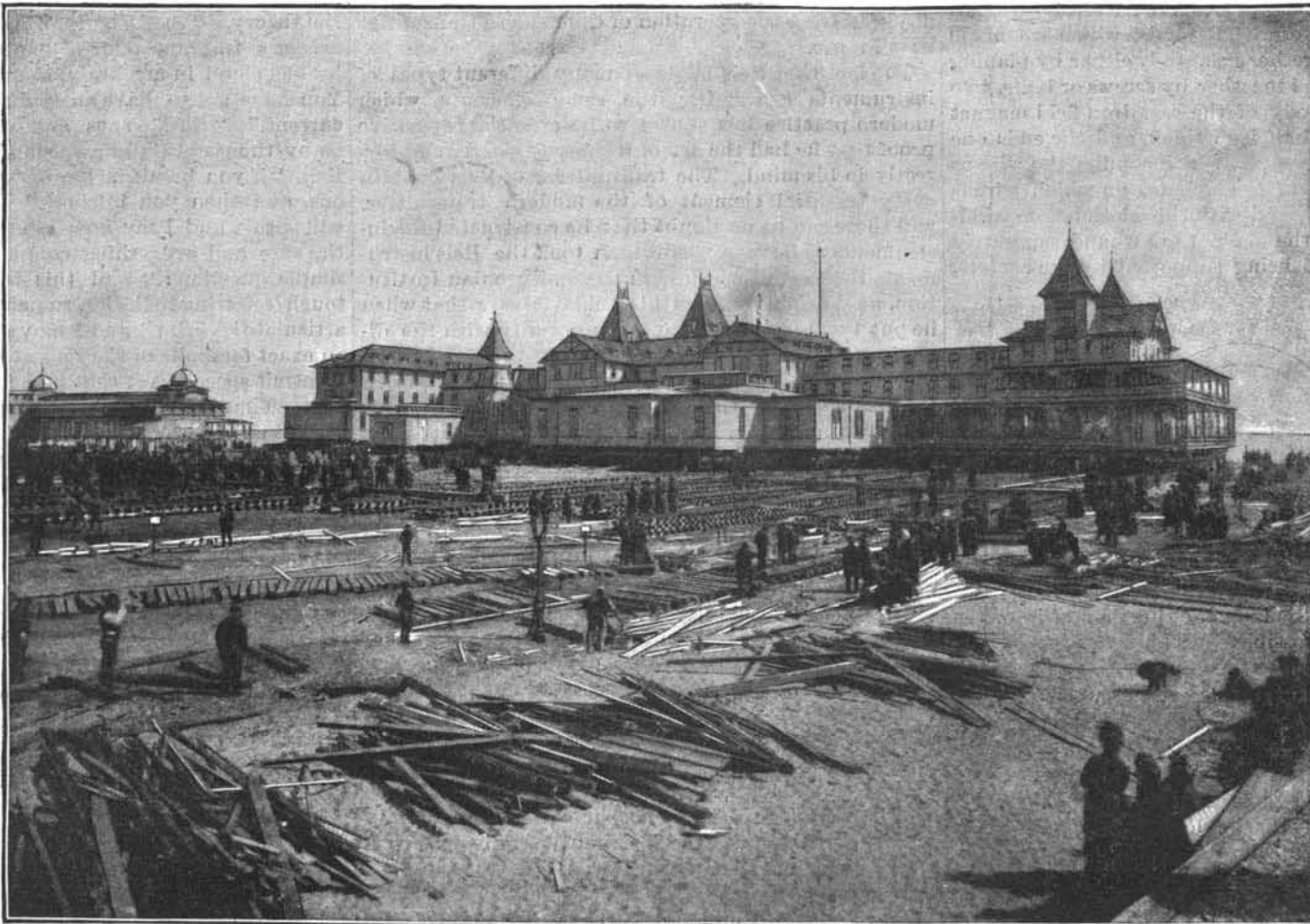
A system of hot water distribution is being introduced in Boston. Thirteen thousand feet of mains have been laid, and lateral connections are in progress. Hot water under a pressure of about 300 pounds to the square inch and heated to 350° to 400° is used. The supply pipes are 4 inches in diameter and the returns 8 inches. These pipes are thoroughly covered by non-conductors of mineral wool and asbestos paper, and rest upon rollers, and also have suitable stuffing boxes at frequent distances to allow for expansion and

contraction. The tunnel or subway containing the pipes is surrounded by a double row of brickwork with an air space between, and frequent manholes lead to the surface.

It is proposed to use this system for steam heating, making use of reducing valves to diminish the pressure from the water pressure of 300 pounds to the square inch to some convenient amount, allowing it to expand into steam. The portion of the water which is not converted into steam will be able to return to the system through the large return pipes before referred to. In addition to ordinary purposes for which steam is used, it is the intention of applying it for protection against fire. It is estimated that there are 1,000 buildings within the area selected for the work of the company, and containing 130,000,000 cubic feet of space requiring artificial heat in cold weather. This, in addition to the amount of steam power required for elevators and some minor manufactures, will represent an aggregate of 10,000 horse power from the station.

**Naval Carrier Pigeons.**

The French authorities are attempting to make use of carrier pigeons for conveying information from war ships at sea to certain stations on land, and with this object have fitted up on the St. Louis a dove-cote, painted the most gorgeous colors, in order to permit the birds to recognize their home from a great distance.



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cars. As abutment the forward blocks were attached by chain slings directly to the rails. The tackles were arranged so that there were twelve falls, the end of each of which was carried to the motors. A number of thirty-five ton locomotives were on the ground. They were placed upon two tracks, and six ropes leading from the falls were attached to the coupling at the rear of each set of engines. Some of the tackles crossed each other, so that each set of engines had its pulling strain distributed over more than half the face of the building. The strain was taken up on each fall before it was attached. Three tons of rope were used in making these connections. The handling of falls, etc., incidental to their final arrangement was executed partly by a small engine. A man was sent around under the hotel with a steel wire to work the oil and waste well around the journals of the wheels. This was no small affair, as there were nearly nine hundred to be attended to.

When all was ready, the signal to start was given. For the first pull, April 3, the orders were to start the building and then immediately stop. Six locomotives were used. The ropes gradually tightened, and the building without a shake or tremor moved back majestically, and stopped after a short distance had been traversed. A careful examination showed that all had worked perfectly. On the afternoon of the same day a longer pull was given. Then on April 4, with only four engines, the hotel was again moved, and was left two hundred and thirty-nine feet back of its original posi-