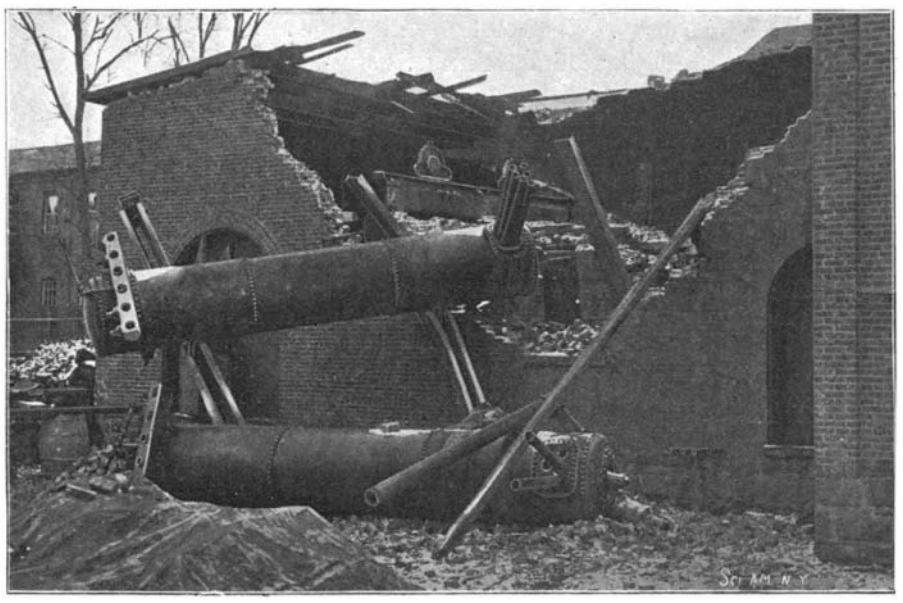
CURIOUS EFFECTS OF BOILER EXPLOSIONS.

BY D. A. WILLEY.

The recent disastrous explosion in New York may always remain a mystery, as far as its cause is concerned; indeed, it is an interesting fact that many of the worst accidents of this kind have been due to causes which could never be discovered. Not only is this true where explosions from combinations of chemicals occur, but where steam or some other motive power is used to operate machinery.

Engineers say that steam boilers cause more mysterious explosions than gunpowder, dynamite or any other explosive. Many cases are on record where the engineer has left the boiler filled to the proper point with water, the fires in perfect condition and apparently every portion of the machinery in good working order; yet, in a few minutes, an explosion has occurred which has blown the building to pieces, possibly killed several persons, and done much damage to property. An investigation fails to reveal any reason whatever for the accident. It is a noticeable fact that engineers are very superstitious and perhaps these explosions without apparent cause make them so. Even a slight accident to an engine frequently causes it to become "hoodooed," or to be considered as unlucky in the eyes of engineers or firemen; and not unfrequently they give up caring for it and get another position. As shown by the accompanying illustrations, some very curious results have resulted from boiler explosions. One of the most remarkable occurred at the works of the National Oil Company at Piqua, Ohio. The works were located on a small creek, running through the center of the city, and in front was a bridge by which many of the employes reached their homes. The engine house was located directly in front of the large building shown in the illustration, and was separated from it by a heavy brick wall. The explosion reduced the engine house to a mass of brick and kindling wood, and the force of the explosion being chiefly in a vertical direction. The small office building which will be noticed between the mill and a frame storehouse on the left side of the illustration was untouched, but the explosion blew a corner out of the warehouse and most of its contents went into the creek. As will also be seen, a big hole was blown in the bank, and one of the abutments of the bridge was carried away. The side walls of the mill were practically uninjured. Although nearly 100 persons were at work in and around the place at the time, none was killed, and only three were injured.

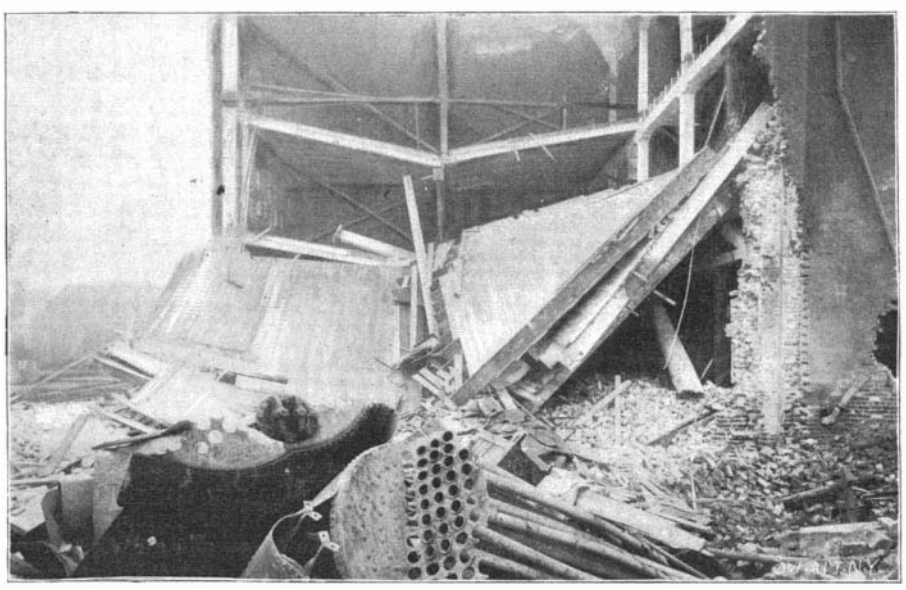


TWO STEAM DRUMS OF A BOILER BLOWN THROUGH BOILER HOUSE.

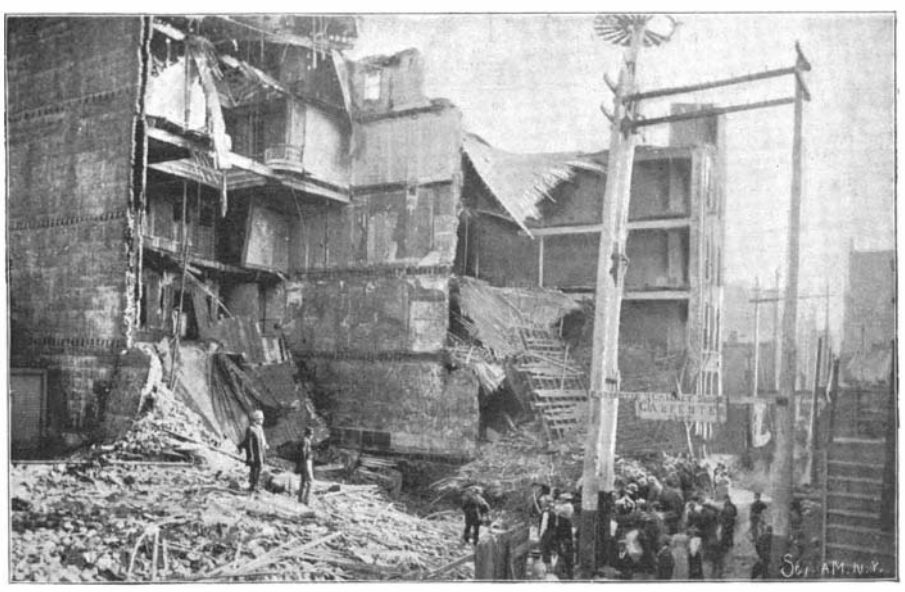
Another illustration shows the wiping out of existence of a harness factory in Massachusetts. Such was the force of the explosion that the entire building was practically leveled to the ground. The location of the engine house can be seen by the mass of twisted boiler tubes which projects in the foreground. The small frame building seen near the boiler tubes was carried to the spot, after the explosion occurred, by the contractor, who secured the work of clearing away the debris. The force of the explosion is seen on the adjoining building, where although the building itself is uninjured, the glass in two of the windows has been entirely blown out, while panes in a large number of others have been shattered. Considering the force of the explosion, experts have considered it strange that the side wall was not blown in.

The accident which wrecked the Gumry Hotel at Denver, Colo., was one of the worst in the history of boiler explosions in the United States. Twenty-two persons were killed and the damage done amounted to nearly $75,000. Although the engine room was located in an extreme corner of the hotel, such was the force that the entire rear portion was blown out. Several of the rooms occupied by guests in this part of the hotel were practically obliterated, as will be seen in the photograph. Some of the rooms were half torn away, leaving exposed the ragged edge of the flooring, with some of the furniture standing intact in the room. A number of the victims lost their lives by being buried under the timber, plaster and brick, which covered the ground in some places to a depth of ten feet.

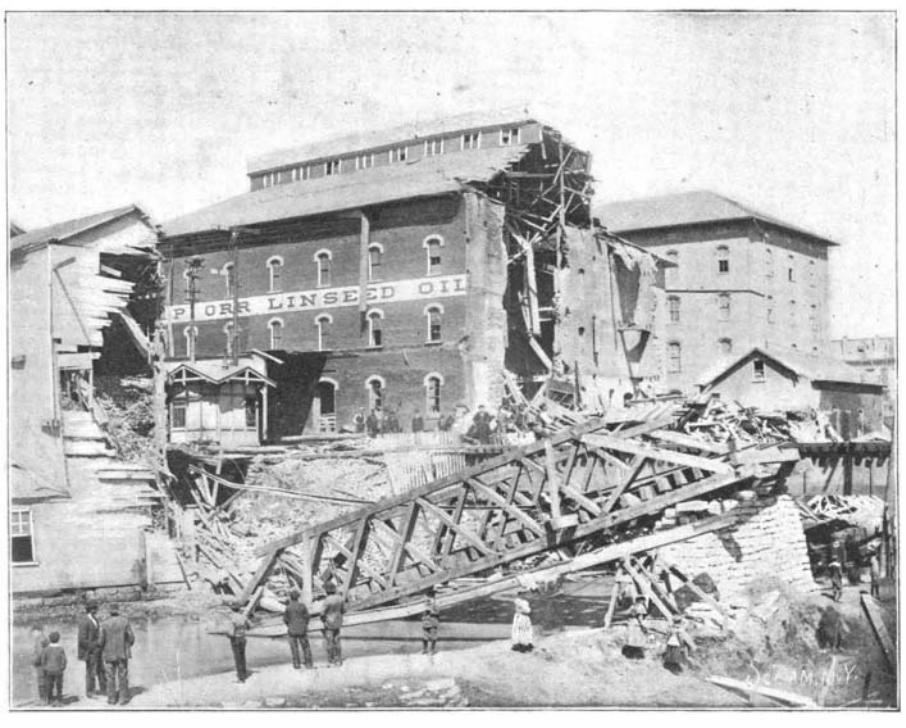
Without any warning whatever one of the boilers in the engine room of the factory of the Detroit Cabinet Co., at Detroit, Mich., blew out, one afternoon, killing two persons and injuring seven. The force was such that it tore a square corner out of the building almost as perfect in shape as if it had been taken out by a gang of builders. It weakened the flooring supports in the entire building so that they had to be replaced, and twisted the boiler into the peculiar shape shown in the illustration. An idea of the thickness and size of the plates is given, yet they were twisted like so much tinplate. In the case of an explosion at the Peerless Rubber Co.'s works at New Durham, N. J., two steam



EXPLOSION OF BOILER OF DETROIT CABINET COMPANY—SQUARE CORNER TORN OUT OF THE BUILDING.



GUMRY HOTEL EXPLOSION, DENVER, IN WHICH TWENTY-TWO LIVES WERE LOST.



BOILER EXPLOSION AT THE WORKS OF THE NATIONAL OIL COMPANY, PIQUA, OHIO.

COMPLETE DEMOLITION OF A HARNESS FACTORY BY BOILER EXPLOSION—NOTE BROKEN WINDOWS IN ADJOINING BUILDING.

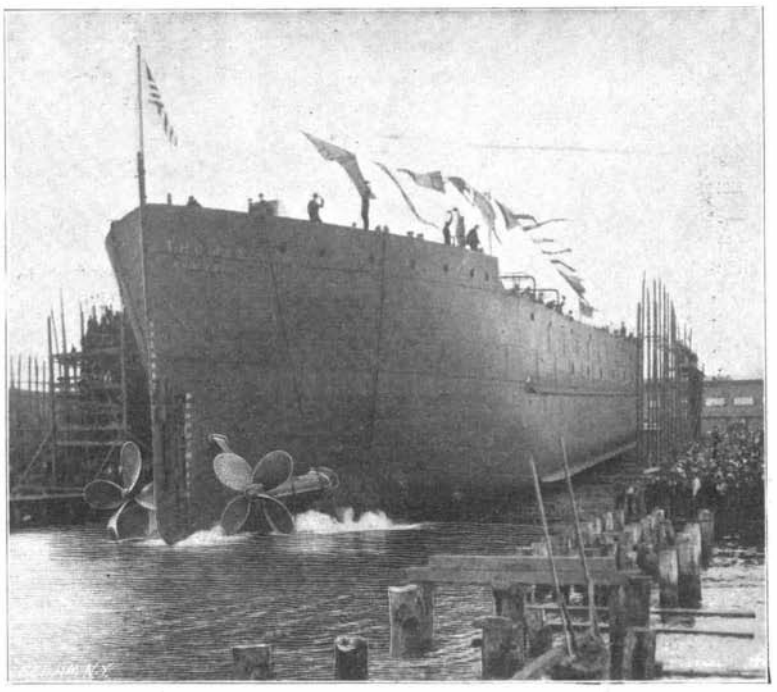
drums of a boiler were blown through the side of the boiler house and landed uninjured on the outside of the building. The accompanying illustrations were prepared from photographs secured through the courtesy of the Hartford Steam Boiler Inspection and Insurance Company, of Hartford, Conn.

DREDGES FOR THE NEW 40-FOOT CHANNELS OF NEW YORK HARBOR.

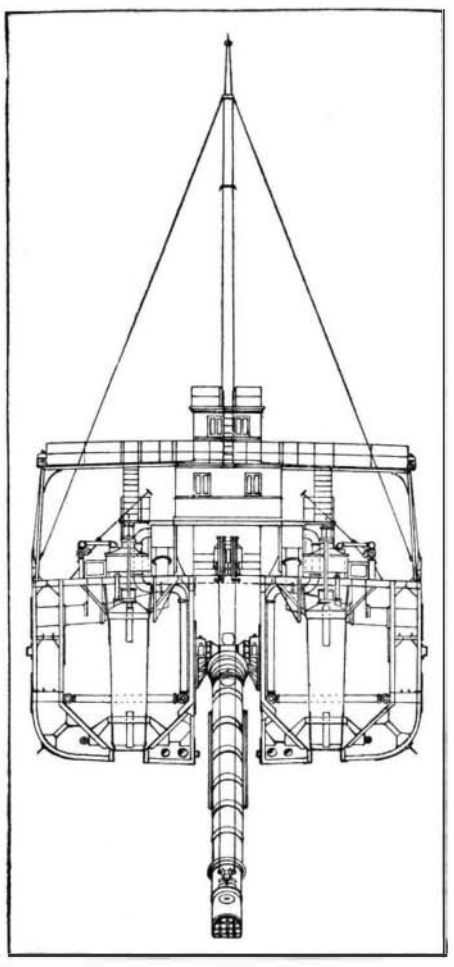
The rapid increase which has taken place of recent years in the size and draught of ocean steamers has necessitated considerable deepening of the channels both in the approach to New York harbor and in the harbor itself. According to statements emanating from the steamship companies in this cty, the largest of the modern freighters have left New York harbor drawing on more than one occasion from 30 to 31 feet of water, and there is now in service one steamship, the "Oceanic," which was designed to draw at full load 35 feet of water, this extreme draught being adopted in the expectation that the New York harbor channels would shortly be deepened.

The scheme of improvement which has received the sanction of Congress contemplates cutting a channel from the 40-foot line, 3 miles outside of Sandy Hook, to a junction with the present main ship channel at a point off the southwesterly end of Coney Island, a distance of 7 miles, and also the dredging of three channels, to be known as Bay Ridge, the Red Hook and the Buttermilk channels, which will extend along the Brooklyn shore from near the northerly entrance to the Narrows to and around Governor's Island until a junction is made with the 40-foot line from the East River to the Hudson River. In the accompanying sketch these new channels are shown in shading. The new channel at the entrance to the harbor will be 40 feet in depth at mean low water and 2,000 feet wide. Bay Ridge, Red Hook and Buttermilk channels are also to be 40 feet deep at mean low water, and each will have a width of 1,200 feet.

The most important waterway, of course, is the entrance channel which will be cut from the 40-foot contour line outside Sandy Hook, across the bar, and will extend in a straight line for 4 miles, to finally swing in to a junction with the deep natural channel through the Narrows. The amount of excavation necessary to complete this great work, which by a recent Act of Congress is to be known as Ambrose Channel, is estimated at 39,020,000 cubic yards, measured in place. The Ambrose Channel will take the place of the present main ship channel, which runs in a general southerly direction from the Narrows to a point opposite Sandy Hook Point, when it takes a sharp turn of over 90 degrees to the east and runs out in a fairly straight line to deep water. This turn has always been a hindrance to navigation, especially since ocean-going steamships have increased to lengths of from 600 to 700 feet. By the Ambrose Channel, as will be seen from the map, shipping can steam from the North River to the deep sea without having to make any turn that necessitates such extreme caution as must be observed in navigating the present waterway. The dredging that is to be done along the Brooklyn shore will necessitate taking out 16,400,000 cubic yards measured in place, and when the work is completed the whole of this important waterfront, with the wharves, elevators, and warehouses, adjacent to these channels will be available, not merely for the largest vessels which are now afloat, but for the largest which are likely to be built for many a decade to come. We illustrate herewith one of the two dredges (the most powerful of their kind in the world) which have been specially constructed for the work of excavating the Ambrose Channel. It will be seen from their dimensions that they are veritabe sea-going steamships. It was necessary to build them of great power and size to enable them to work in the exposed positions in which most of the dredging must be carried on. The first of the two, which has been named the "Thomas," recently came up from the Maryland Steel Company's works at Sparrow Point, Md., where the two dredges have been constructed. They are of what are known as the hydraulic hopper type, and they are the first sea-going dredges to be built in the United States. Preliminary trials of the "Thomas" have been made by the Metropolitan Dredging Company of New York, which has the contract for cutting this channel.



LAUNCH OF THE DREDGE "THOMAS."

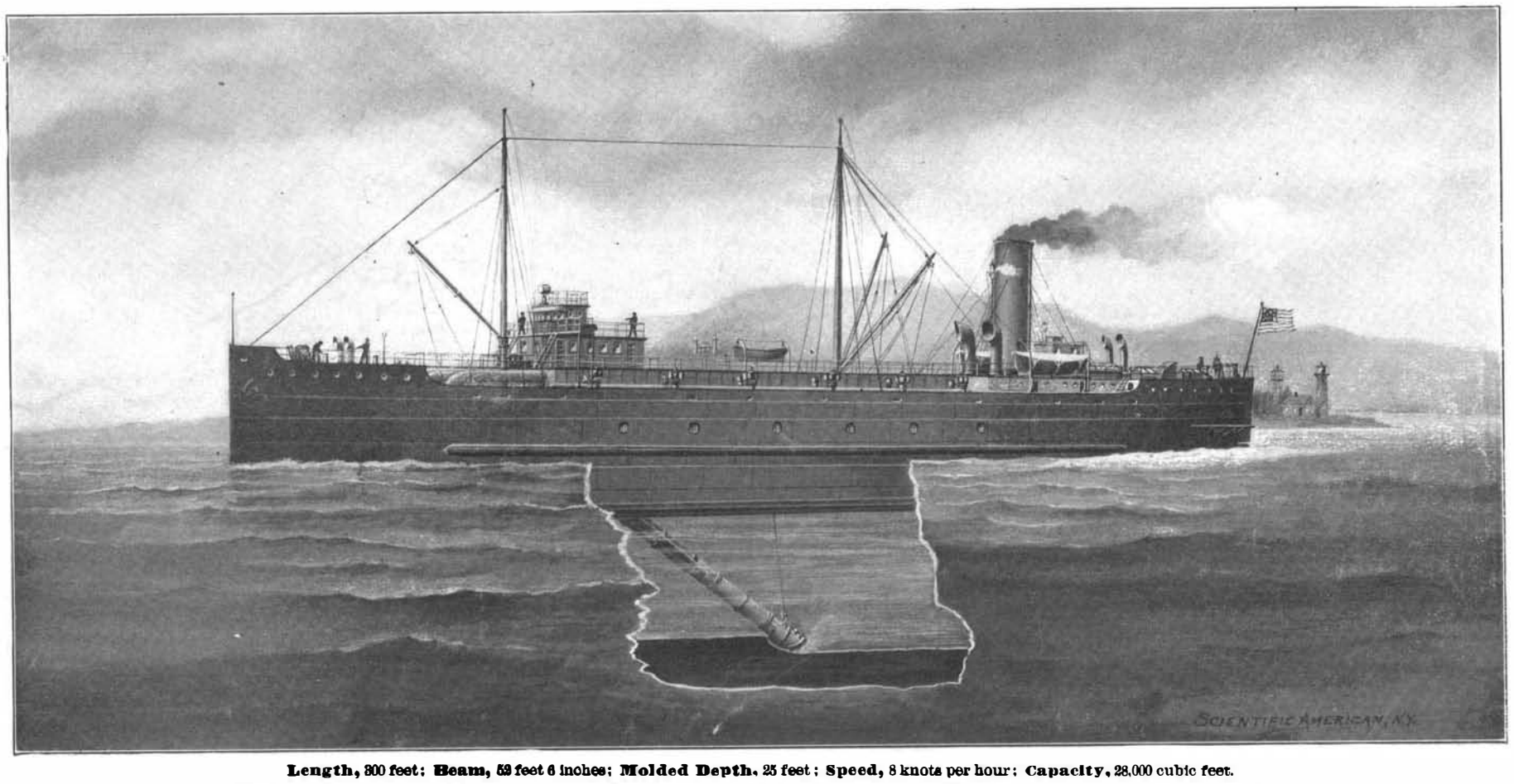


SECTION THROUGH HOPPERS.

In a general way the "Thomas" is modeled on the lines of the "Brancker," the first of two large sea-going dredges which have been doing excellent work in maintaining a proper depth of water in the Mersey, England, but the capacity of the "Thomas" and the sister dredge will be some 30 per cent greater than that of the Mersey dredges.

The principal dimensions are as follows: Length, 300 feet; beam, 52 feet 6 inches; molded depth, 25 feet. Outside of the space which is necessary for machinery, bunkers, and the crew, the body of the ship is utilized for holding the material which is sucked up from the bottom of the channel. The quarters for the crew are located forward, while the main engines and boilers are aft. The vessel is propelled by twin-screw, triple-expansion engines, with cylinders 18 inches, 28 inches and 45 inches in diameter by 30 inches stroke, and the estimated speed when she is loaded is 8 knots an hour. Steam is furnished by two Scotch boilers at a working pressure of 180 pounds to the square inch. The body of the vessel is occupied by twelve large receiving hoppers, which are arranged in two lines on each side of the center line of the vessel; eight of these are 20 feet long by 18 feet wide, while four of them are 22½ feet long by the same width. They extend vertically from the bottom of the vessel to the main deck, a distance of approximately 26 feet, and they have a combined capacity of 28,000 cubic feet of material. Each of these hoppers is provided at the bottom with a central discharge valve, opening through the floor of the vessel. The valve is controlled by a hydraulic cylinder, the plunger of which is 12 inches in diameter by 36 inches stroke.

The method of dumping is ingenious and very effective. The discharge opening is circular and about 4



Length, 300 feet; Beam, 52 feet 6 inches; Molded Depth, 25 feet; Speed, 8 knots per hour; Capacity, 28,000 cubic feet.

HYDRAULIC SELF-PROPELLED DREDGE "THOMAS," FOR CUTTING NEW 40-FOOT CHANNEL, NEW YORK HARBOR.