A FOOT-POWER HAMMER.

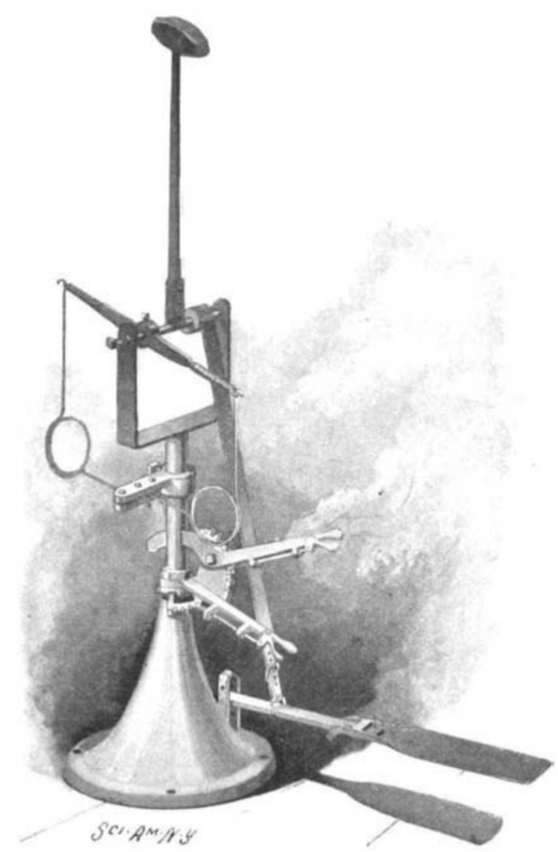
In an ingenious invention patented by Frank Dowling, of Coleridge, Neb., a mechanism is provided for holding a hammer or sledge, which is operated by the foot of the blacksmith whenever desired, thus dispensing with the services of an assistant.

Upon a strong, substantial base, a post, vertically and rotatably adjustable, is mounted. A sledge-hammer is pivotally mounted on the post; and to the pivot of the hammer oppositely-extending arms are secured provided at their ends with coil-springs hooked to the ends of upwardly-extending continuations of spirally-coiled springs, the horizontal continuations being clamped in a holder adjustably carried by the post. The tension of the springs will hold the hammer normally in vertical position.

In order to regulate the elevation of the sledge and the direction of its swing so that it can be made to strike on any portion of the anvil, a segmental horizontal rack is secured to the base, which rack is engaged by a lever mounted to turn horizontally on the base and provided with a vertical segmental rack. On this vertical rack a second lever is pivoted having an extension forward of its fulcrum, inserted through a slot in the post.

The pivot-shaft of the hammer is provided with a small pulley or roller to which one end of a belt is secured, the other end being buckled to the shank of a treadle, whereby the hammer is operated.

By means of this device the blacksmith can operate the sledge and simultaneously use a hand-hammer. The machine will cause the sledge always to strike in the same place.



DOWLING'S FOOT-POWER HAMMER.

CABLES OF THE NEW EAST RIVER BRIDGE.

The new East River Bridge will be the longest and considerably the largest suspension bridge in existence. Although it will be only a few feet longer between towers than the present New York and Brooklyn structure, the main span being 1,600 feet, the suspended structure will be considerably wider and more massive, the roadway having a full width of 118 feet and accommodating two steam railroad tracks, four trolley tracks, two roadways, and two passenger sidewalks.

The bridge has now reached the stage in its construction in which the contracts for the cables and suspenders have been let. We herewith present a sheet of drawings showing the details of these important elements of the structure. The cables will be four in number, and each cable will consist of 37 strands of No. 8 steel wire, each strand containing 281 wires. There will therefore be in each cable 10,397 wires, or 41,588 in the four cables. The wire will be 0·165 inch in diameter, and it must have a breaking strength of 200,000 pounds or more to the square inch, and it must show an elongation of at least 5 per cent in 8 inches of observed length. It must also be capable of being coiled cold around a rod of its own diameter without cracking. All the wires of each cable strand must be spliced so as to form one continuous wire. The splices (see drawings) must have 95 per cent of the full strength of the wire.

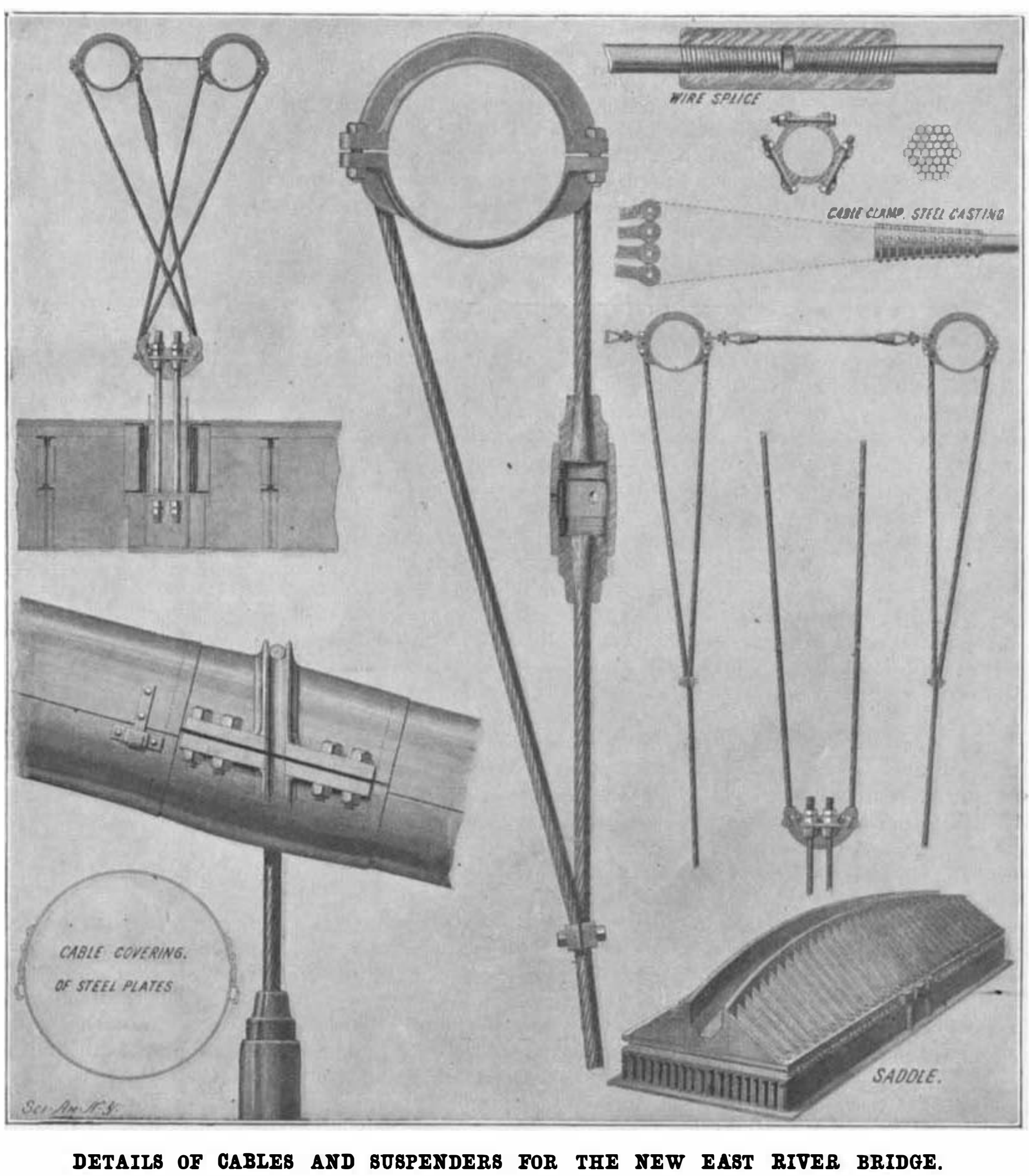
Great care will be taken to protect the wires from oxidation. As they come from the drawplates in the mill they will be passed through hot linseed oil, and the assembled cables will be filled in and coated with a special cable filling. The 281 wires of each strand will be laid straight and banded with five or six turns of wire at intervals of five feet, to hold them temporarily in place, the interstices of the cable wires being filled with a special anti-oxidation filling. When the 37 strands that make up a cable are complete, the temporary wire wrappings will be removed; all the 10,397 wires will be drawn compactly into cylindrical form; and then at intervals of 20 feet the main cable bands (see drawings) will be put in place and screwed up so as to take a tight grip on the cable.

In the cables of the Brooklyn Bridge, protection is afforded from the weather by wrapping them with wire. This is not very satisfactory, as the changes of temperature cause the wires to separate, not, as was hoped, evenly, but at intervals of one or two feet. The openings thus formed are sufficient to allow the water to penetrate, and great care has to be exercised to prevent rusting of the cable wires. This is remedied in the East River Bridge by using half-round $\frac{1}{16}$-inch steel covering plates, which extend from main band to main band. The under half of the cover plate is put on first, and the cable filling, which is a mixture of pine tar and graphite and other ingredients and is absolutely undriable, is packed in between the cable and the shield, while more of it is plastered over the upper half of the cable. The upper half of the cover plates is then put on and locked to the lower half. Where the main band and cover plates meet, they are overlapped in such a way as to completely shed the rainwater and other moisture (see drawings). At the anchorage the strands of the cables will pass through a massive funnel-shaped cable-clamp (see drawings) and around 37 spools or "strand shoes," carried by the ends of the massive eye-bars which lead down to the base of the anchorages.

The suspenders, which will be placed abreast at every 20 feet of the length of the bridge, will be of 7-strand (wire core) steel wire rope 1¾ inches in diameter. On the Brooklyn Bridge there are four separate suspenders, one at each cable; but in the East River Bridge there will be but two, one to each pair of cables, as shown in the accompanying drawings. Each suspender will have socketed screw ends, one with a right and the other with a left hand thread, which will be joined by a sleeve nut as shown. Each of the main bands of the cable is cast with a half-round saddle to receive the suspender. The upper left hand figure of the drawings shows the method of attaching the floor system to the suspenders. This is done by means of four 2⅛-inch hanger bolts, which extend from the bottom flange of the stiffening truss, at the point of its intersection with the floor beam, to the bottom cast steel shoe or saddle of the suspenders. After the suspender has been laid over the upper main band saddle and beneath bottom shoe, and its ends coupled by the sleeve nut, the proper load is thrown upon the suspenders by means of a temporary knife-edge adjusting block. The nuts shown in our drawing are then screwed up and the adjusting block is removed. The smaller drawing shows a suspender at the center of the span, while the larger view shows a long suspender near the towers and the method of connecting up the lateral ties.

The saddles are massive ribbed castings of the form shown in the drawings, each of which weighs over 32½ tons. They are 7 feet 8 inches wide by 19 feet long and 4 feet deep at the center. The cable rests in a recess struck to a 21-foot 6½-inch radius, the recess being semi-octagonal in cross section. The saddles are supported upon twenty-two 15-inch steel channels, laid parallel with the axis of the bridge, and the movement of the saddles is provided for by the interposition of forty 2¼-inch steel rollers. In erecting the cables, the saddles will be placed 6½ inches back toward the anchorages from their final position. When the load of the suspenders and floor system is added, the saddles will be drawn forward 6½ inches to their normal position over the towers.

We are indebted for our information to Mr. L. L. Buck, the chief engineer, and Mr. O. F. Nichols, the chief assistant engineer of the bridge.



DETAILS OF CABLES AND SUSPENDERS FOR THE NEW EAST RIVER BRIDGE.

New Electric Light Carbons.

It is stated that a proposition will be made to this city to furnish it free of charge with a certain amount of a new kind of electric light carbons, so that tests may be made and the advantage of using them, if any there be, may be ascertained. The carbons are the invention of Frederick Hackman, of St. Paul, formerly of this city. It consists of a carbon tubing filled with calcium carbide powder. The effect, it is said, is the production of a light of at least eight times the brilliancy of the ordinary carbon. Mr. Hackman has tried to introduce this carbon in St. Paul, and the board of public works of that city has favored his idea to the extent that in advertising for bids for electric lighting it has specified his carbide carbon. The council also adopted the views of the board of public works in this respect. The proposition was that the company which furnishes the electric lighting for the city of St. Paul should furnish the current, meters should be supplied to determine the amount of current used, and that the company should be paid in proportion to this amount. The claim was made that the calcium carbide carbon light required a considerably smaller amount of current, as demonstrated by tests, and that a great saving would be made by the use of the new carbons. But the electric company, it is stated, claimed that by using the new carbon and having the current measured by meters it would be unable to run its plant at a profit, because the amount of current to be furnished by it would be smaller on account of the saving of the current.—Electrical World and Engineer.

Unique Church Edifice.

In a new church edifice which is being planned for erection in the city of Brooklyn, some unique ideas are being embodied. One of them is an open air auditorium on the roof, to be reached by elevators. It is thought that a large number of people will attend services if they could be held in the open air. It is a unique experiment, and this development of the roof garden idea will be watched with interest.