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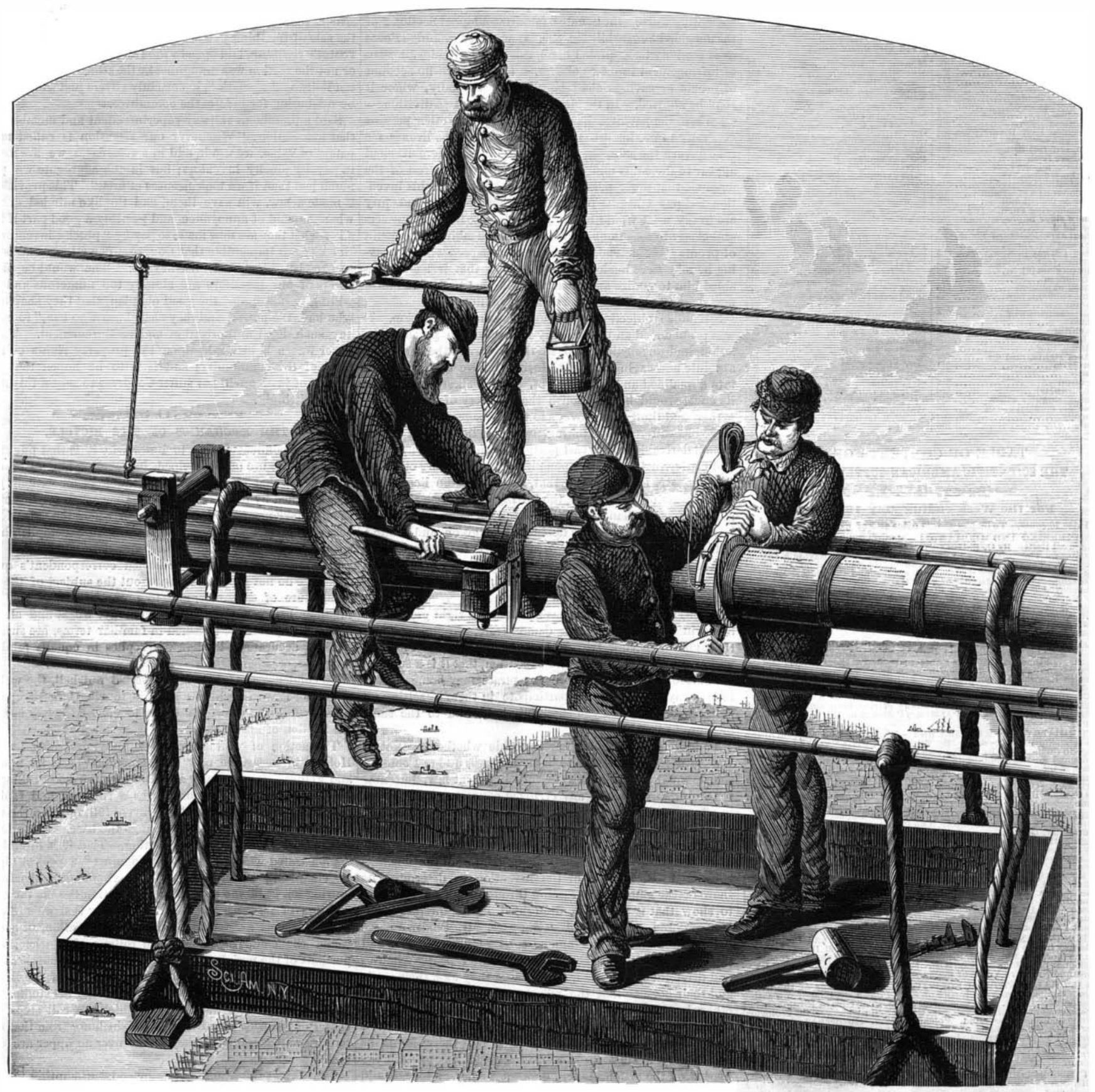
COMBINING THE STRANDS OF THE EAST RIVER BRIDGE CABLES.

In tracing the progress of making the superstructure of the East River Bridge, it will be remembered that we began with the manufacture of the steel wire, and afterwards explained how the great coils were unwound, and the wire carried across the river from anchorage to anchorage, to and fro, until it had been passed a sufficient number of times to make a strand. The wire, we stated, weighed one pound per eleven feet, and 261 wires made one of the strands, nineteen of which laid together constitute one of the four great suspension cables. These immense ropes are about 3,500 feet in length each, and extend between the eye bars of the anchorages. When finished they will be sixteen inches in diameter, and their object is to support the weight of the superstructure. Since last summer the work of making the strands has steadily progressed until now twelve belonging to each cable are finished, and a thirteenth is nearly ready for lowering into place upon the saddles on the piers. A sufficient number, therefore, has been completed to allow the assembling to begin, and to the first steps of this important operation we devote the present article and illustrations.

Each cable is composed of two portions, the core and the exterior envelope; the former consists of seven, the latter of twelve strands. When finished this distinction will be obliterated, as all the strands will be bound into one homogeneous cylinder, the object being to protect the wires from effects of the weather, and allow of the convenient attachment to them of the other portions of the bridge; otherwise the strands might lie loosely side by side as they now do. This binding will exist everywhere, except directly on the saddles, and here it is omitted for the obvious reason of the immense labor which would be required to lift the entire cable from the grooves, and which would serve no useful purpose. It follows consequently that, in placing the strands over the saddles, due regard must be had to their ultimate position in the cable, so that, referring to Fig. 2, page 306, the lower-most strand, 1, of the envelope is first laid, then the pair marked 2, then pair 3; above these come the seven strands, in similar order, which go to make up the core. To enable the distinction to be clearly made between core strands and envelope strands, we have made the former black in Figs. 2 and 3.

It will be remembered that the strands are secured by their bights being passed over heavy pins which go through the eyes of the anchorage bars, and also that, after each strand was finished, wire wrappings were placed around it at short intervals apart. Before assembling those strands constituting the core, all these wrappings, excepting those on the center strand of the seven, are removed. Then, at a point twenty-one and a half feet distant from the eye bar ends, lashings are clapped on first upon the lower pair of core strands, then upon the three next above, and finally upon the upper pair, Fig. 3, the object being to draw the strands individually together horizontally. To haul them up close vertically, a rope is attached to one of the envelope strands, 2, Fig. 3, brought up around all the core strands, up again to form a long bight, around the core strands again, and finally secured

[*Continued on page* 306.]



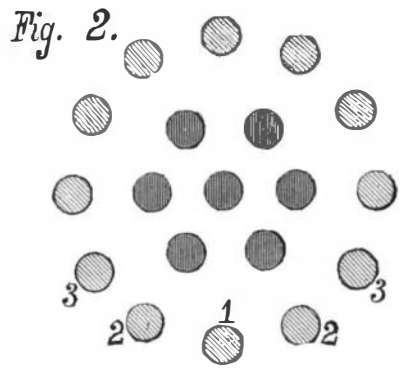
CABLE MAKING ON THE EAST RIVER BRIDGE.

[*Continued from first page.*]

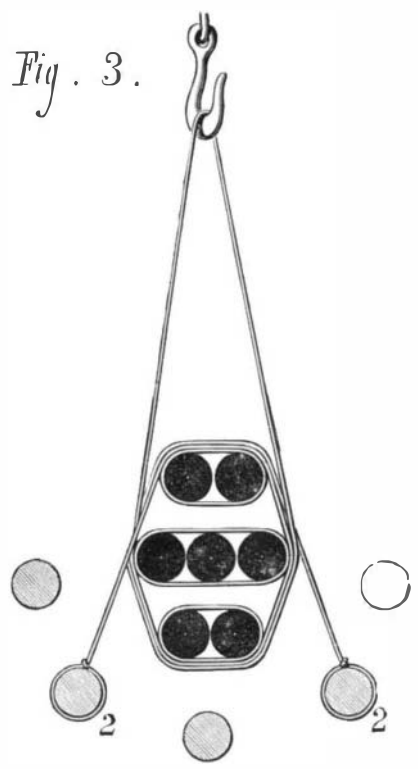
to the corresponding strand, 2, of the envelope on the other side. The hook of a derrick tackle is then put in the bight, and in this way the parts are drawn together. The cross lashings between the strands are then removed. At a few inches inside of the 21 foot 6 inch mark a wooden clamp is applied, and some three feet outward another clamp is attached. Four or five more of these clamps are put on the core between anchorage and pier, for example, and the permanent assembling then begins.

Between the wooden clamps, a massive iron clamp is applied, and its parts are brought together by powerful lever wrenches. This compresses all the strands into an even cylinder, individual wires being prevented from slipping into the joints of the clamp by the downwardly extending horns shown at A, in Fig. 4. There is a special object in thus drawing the core strands so tightly together, namely, to compress them not into a mere assemblage of ropes of circular section, but into a uniform cylinder, of which each strand except the center one will form a segment, as shown in Fig. 4. To assist this formation the strands are beaten into place by heavy wooden mallets, and aided by wedges. The workmen carefully place in proper position such wires as may protrude beyond the smooth cylindrical surface. Now comes the binding, and to do this a buggy is attached to the core, and moved along as the lashings of wire are put in place. The first binding is put on just inside the iron clamp. It consists of No. 14 wire, wound on by an iron ring which encircles the core and has handles to allow of its easy revolution. To this ring the wire is attached, and two men at the handles serve the wire tightly around the core for about 25 turns, the core being previously white-leaded. The end of the wire is secured, the iron clamp shifted ahead, the core is again compressed, another binding is put on, and thus the work progresses, the lashings being about a foot apart.

Three workmen generally occupy the perilous swinging



tray called the "buggy," two engaged as above described, a third handling the wire, and perhaps a fourth man helps in various ways. The dizzy aerial perch of the bridge builders is shown in the engraving on our initial page, and it would seem that they worked on it almost at constant risk of their lives. Yet no accidents by falling have yet occurred. In fact the construction of the great bridge has served to show in a striking manner how men can become habituated to living and working under abnormal conditions, for examples of these are found in the dense atmosphere of compressed air in the caissons while the latter were being sunk, and in the unguarded swinging platforms which traverse the lofty cables. The men seem perfectly at their ease, however, and even tempt fate by walking out on the cables alone, sometimes holding by the slight hand rope provided, or occasionally scorning even this safeguard. The reader may get an idea of the nerve required for this feat by imagining himself walking on a log about ten inches in diameter, placed at an angle of fifteen degrees or so, and at an elevation of a couple of hundred feet. Professional rope walkers, when they essay a performance of the kind, carefully rosin their stocking feet and use a heavily weighted balancing pole; but these workmen walk along unconcernedly with their heavy boots on, and even trot down the inclines, barely touching the hand



rope. One of them laughingly told us that working on the buggy, and getting in and out in the above perilous fashion, had one advantage at least, and that was that tools were safe. Predatory visitors would never find their cupidity sufficiently excited to tempt them from the dizzy foot bridge upon the still more dizzy, narrow, and often greasy core.

When the core is all bound the upper strands, as fast as completed, will be lowered into place, and finally, when all are finished, the core lashings will one by one be taken off, and the whole cable bound together in precisely the same way as above described, larger clamps being of course used. This work, it is expected, will be ended by the coming fall.

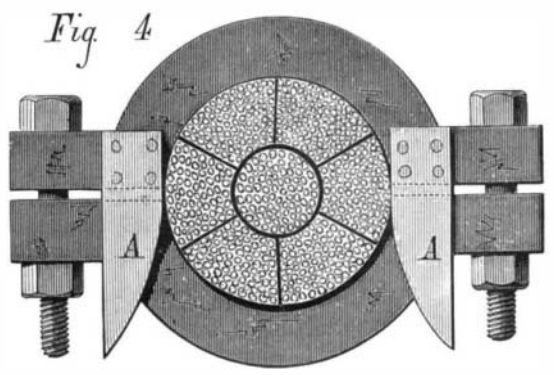
ADVERTISING—A MODE OF MOTION.

When Toddie, in that nursery classic "Helen's Babies," expressed his desire to examine the mechanism of a watch by wanting "to shee the wheels go 'wound," he hit upon a peculiarity of the human race by no means confined to its younger members. Whether it is, as a recent writer on physiological æsthetics has suggested, that anything indicative of life is more agreeable as an object of contemplation than one capable of being associated, however remotely, with thought of death, moving objects being an example of the first, and objects at rest of the second, it is certain that to every one the sight of mechanism in operation is more or less agreeable, and it would seem that the degree of pleasure depends in some measure upon the motion being unusual or unexpected. There is abundant room for speculation on this which we shall not indulge in here, as we mention the topic simply to note that some such mental operation peculiar to most people has recently been turned to account by inventors to enlist attention to advertising signs.

It is positively funny to ride in any horse car in this city, and watch the passengers, sober elderly men and uncontrollable youngsters alike, all gazing fixedly at the moving pasteboard figure of a washerwoman scrubbing clothes, or of a cobbler sewing shoes, or some similar device, inserted in the advertising panels of the cars by enterprising business houses, and kept in motion by the jolting of the vehicle. Why elderly people should persistently stare at these toys is incomprehensible.

We watched a well known and learned judge the other day sit as if fascinated gazing at the figure of a codfish wabbling about in the middle of a fish dealer's advertisement, his newspaper, meanwhile, lying opened, yet unread, on his lap. It is perhaps useless to seek a reason for this. The eye, it is said, delights in circles and curved lines, on account of the gradual use into which all the muscles are called; but we cannot see how it can delight in the irregular vibrations of a pasteboard codfish fastened on a spring. Some people have told us that these moving signs make them actually unhappy—they feel that they must look at them, as if drawn by an irresistible attraction—like Mark Twain's clerical friend who, after once learning the famous horse car jingle beginning "The conductor when he receives a fare," never could get it out of his head, but repeated his sermons in the same rhythm.

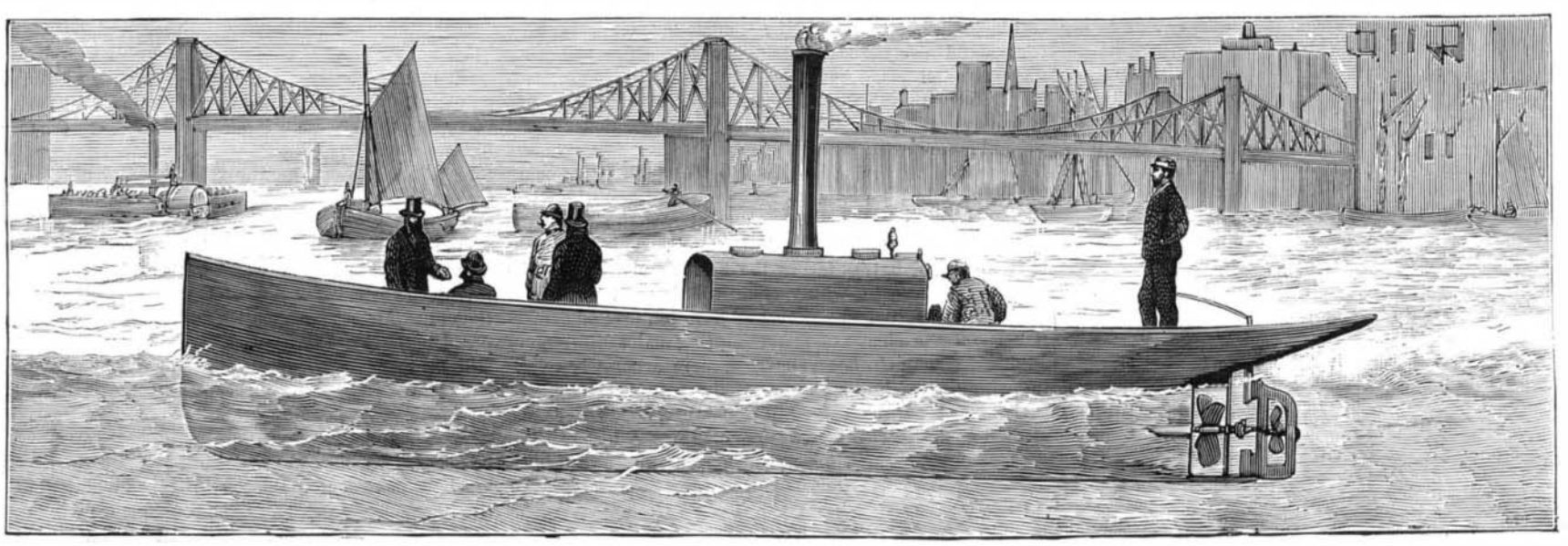
Sensitive people can of course avoid uneasiness of this kind by refusing to patronize cars containing such advertisements, but we fear this mode of escape is short-lived. Another inventor (some nervous individual will assert, actuated by a fiendish and malicious purpose) has contrived a sign which cannot be avoided; it must be looked at. In every one of the large gilt letters this ingenious person makes numerous circular holes. In every hole he suspends a bright tin disk, each being so arranged that all may be vibrated from the moving armature of an electro-magnet, in which the current from a battery fastened behind the sign is alternately broken and established. We do not believe that any one can come within a block of that sign without being morally dragged into looking at it. A crowd, as we write, is standing open-mouthed staring at it. As an individual sign it is an astonishing success, and everybody who sees it will depart with the words "Homes in Florida" persistently flickering on his retina and shaking through his nervous system, dismally suggestive of the tremulous malady incident to Florida swamps. But then, supposing this sign came into general use; suppose both sides of Broadway



united in one grand twinkle and flicker—the idea is too horrible. Some of our readers may have vivid imaginations combined with sensitive nerves, so we forbear.

A RUDDER AND SCREW COMBINED.

The object of this steering apparatus is to make a vessel to turn more quickly than it can be made to do by any other means, an achievement which is manifestly desirable in view of the many collisions which occur from deficiency of steering power. It is claimed to be applicable to vessels of all sizes, and can be worked either by steam or other motive power, and in conjunction with, or entirely separate from, the ordinary screw propeller, and it has the additional advantage of increasing the speed of the vessel when going straight ahead. A glance at the engraving, for which we are indebted to the London *Graphic,* will show that a screw is fitted in the rudder, and this screw is connected with the revolving shaft by means of a universal joint, so that, in whatever position the rudder may be placed, the screw continues to turn, and the course of the vessel is altered with ease and speed.



THE KUNSTADTER RUDDER SCREW.