## THE THIRD AVENUE RAILROAD COMPANY'S NEW CABLE TRACTION PLANT.

The Third Avenue Railroad Company of this city for a number of months past has been engaged in constructing a cable traction plant for propelling cars over its main line running from the Post Office to the Harlem River, through Park Row, the Bowery and Third Avenue. The same company for a number of years has been operating with great success a cable line crossing the city at One Hundred and Twenty-fifth Street and thence running up town on Tenth Avenue. The main line, only now in full operation, represents the most recent improvements in cable traction, and its plant is in every way a model. We illustrate the Sixty-fifth Street driving plant and some minor features of the system.

The entire line is worked from two stations, one at the corner of Bayard Street and the Bowery, the other at Sixty-fifth Street and Third Avenue. The cable is divided into three divisions: The upper division runs from One Hundred and Twenty-ninth Street down to Sixty-sixth Street, crossing the other cable line at One Hundred and Twenty-fifth Street. Here the cars drop the cable and cross the other line by their own momentum. Reaching Sixty-sixth Street another change must be made to the middle division. The cable again is dropped, the car runs over the intervals between the two cables by its own momentum, comes to a stop and picks up the middle division cable. This cable draws it to a point between Sixth and Seventh Streets; up to this point the car has been driven at the rate of 9 miles an hour. Between Sixth and Seventh Streets the middle division cable is dropped and the lower division cable is picked up. This involves a reduction of speed to a rate of 6½ miles an hour. Both the upper and middle division cables are driven from the Sixty-fifth Street station; the other cable is driven from Bayard Street. At Bayard Street another change is made. The main cable on the down town track is carried to one side and in its place an auxiliary cable running 5 miles an hour is substituted. The auxiliary and main cable then run down town and around a loop at the Post Office, the auxiliary cable being under the slot. Hence, when a car gets to Bayard Street it drops the main cable and picks up the auxiliary one, and then goes through Park Row and around the loop at the end of the line at the rate of 5 miles an hour. After running a few hundred feet on the return, the car drops the auxiliary cable, which then runs to one side, and picks up the regular cable and continues its journey at the rate of 6½ miles, changing the cable and its speed to 9 miles an hour at Sixth Street, and changing to the upper division cable at Sixty-sixth Street.

Throughout the conduit lies a duplicate inactive cable on independent sheaves following a line parallel with the operating cable, which duplicate cable can be driven when required by an entirely independent driving plant, an exact duplicate of the working one. The car grip is two-sided, and without any change is adapted to pick up and retain either cable; hence, if any accident happens, the duplicate plant is instantly started in operation. The duplication is so complete that neither plant can be distinguished from the other in any respect, and the entire reserve cable operates as the regular one.

The traction cables are 1½ inches in diameter, 6 stranded, with 19 wires in each strand and with a hemp core. They are made of crucible steel and weigh 3·65 pounds per foot. The cars, which are built by the Laclede Car Company, of St. Louis, Mo., are 30 feet 1 inch over all, weigh 5 tons and have a seating capacity for 32 passengers. One hundred and eighty cars will eventually be run upon the line.

The grip is slung by the dovetailed ends of the upper bar from two boxes carried by the axles. To remove it from a car it can be dropped bodily from its place, or a trap in the floor of the car can be opened and the grip can be lifted bodily through that. It weighs 450 pounds and can be handled by four men. The grip is operated by a lever, so that an inspector can tell at a glance whether the grip is in action or not. For picking up and releasing the cable an auxiliary lever is employed, which extends the range of action of the grip, which extension of range is necessary during the picking up or dropping of a cable. To throw the cable out of the grip a wedge-shaped piece seen at the bottom of the grip on the end facing the reader is drawn upward; its inclined face pushes its rope to one side and out of the grip.

The cars are provided with life guards carried by the journal boxes of the wheels and hence holding an invariable level as referred to the pavement. The guard is faced with rubber, set so as to come in contact with the pavement, and it eventually wears to the surface. The life guard is so far under the car that the gripman has an extra space in which to stop the car before the life guard touches any one prostrate on the track.

The boiler plant in the Sixty-fifth Street station contains thirty-two 125 horse power boilers. They are of the double return horizontal tubular pattern, each containing ninety-two 3 inch tubes. They are arranged in batteries of four. Their shells are 6 feet in diameter and 18 feet long and they maintain a steam pressure of 90 pounds to the square inch. Four 1,500 horse power Corliss engines, with 40×72 inch cylinders, are arranged to drive the machinery. The engines make 65 revolutions per minute. Their power is transferred to the cable driving plant by means of rope belting, which is one of the striking features of the plant, and is well shown in our cuts. On each drive wheel 22 endless cotton ropes 2¼ inches in diameter are employed. By friction clutches the power can be shifted about in any desired way from engines to drums and driving wheels.

The cable, as it enters the house, passes a number of times around two grooved pulleys, seen in the foreground of the drawing of the Power House Interior. The bar connecting the shafts of these wheels is adjustable, so as to regulate their distance apart. A tension railroad with a range of some 200 feet keeps the cable stretched, and is calculated to be of sufficient extent to take up all the stretch that may affect the cable during its entire lifetime. A 30 ton Sellers steam crane surmounts the power house and travels from front to rear, thus giving every facility for handling parts of the machinery. The plant was erected by the Pennsylvania Iron Works Company.

It is of course possible that a gripman might neglect to drop the cable at the proper place, and hence cause an accident. To prevent this danger automatic mechanism is introduced in the conduit wherever the cable is to be dropped, which mechanism actuated by the weight of the car throws up a bar of iron, which releases the cable if the gripman has neglected to do so; if he has released the cable, the bar is thrown up but does not affect the grip mechanism.

It is impossible in our space to describe all the features of this plant. Minor details are introduced at all points, affecting in no small degree the perfection of the whole. The plant is installed in the rear of the old building. The latter it is proposed to replace by a new one at an early date. One feature of the line is that no horses are used at points where the cables are changed.

Our thanks are due to Mr. J. H. Robertson, superintendent of the Third Avenue Railroad, and Mr. C. G. Bliss, chief engineer of the operating department.

### The Fire Alarm.

"One of the greatest difficulties the firemen have to contend with is the fact that fires are allowed to gain too much headway before they are informed of them," said Chief Bonner the other day to a New York *Sun* reporter. "The reason for this is that the average citizen has not had the good sense to take a few necessary and simple precautions. When a fire does break out in his house he is caught totally unprepared, and, in nine cases out of ten, loses his head and tries to extinguish it himself, without giving a thought to the fact that such things as firemen exist. After wasting valuable time without accomplishing any good, he is finally forced to give up his task, and then calls on the firemen. Of course, it takes him considerable time to do even this, as he is probably unaware of the location of the fire alarm box, and when he does find it is ignorant as to its workings.

"We calculate time by seconds in the case of alarms, and it is the duty of every citizen to co-operate with us. If he did so there would be small chance of any loss of life with the modern life-saving apparatus where we get a chance to use it. Now, I don't mean to say that an alarm should be sent in at a sign of smoke or flame, or on suspicion that there is a fire lurking in the house, but a little common sense with quick judgment will do. In the first place, everybody should be prepared for fire at all times. The citizen should inform himself and family of the nearest fire alarm box to his home or store, and ascertain where to find the key and also how to give the alarm. This is an easy matter. The location of the key is to be found on a sign on the pole to which the fire alarm box is attached. Any reputable citizen can obtain a key by making application to the commanding officer of the fire company nearest his location. Some fire alarm boxes have keys attached to a chain and tag and fastened to the box, so that they are ready for use in a moment. Of course the department takes the risk of false alarms in such cases, and the presence of the key depends largely on the locality. The penalty for sending in a false alarm is $500 or a term of imprisonment, and it is enforced where the culprit is caught and can be convicted.

"In order to show you just how to send in an alarm, so that there can be no error, the boxes have instructions printed, so that he who runs may read. After opening the outer door another door is disclosed, which has a hook on the outside. This hook should be pulled down as far as it will go, only once. This hook catches a lever on the inside and winds the machinery. You can plainly hear the tapping of the signal inside, and if you should not hear it after a second trial, why, the box is out of order, and the next nearest box should be tried. The keyless boxes have an alarm gong connected with the handle, which rings just as soon as the handle is moved. This does not send the alarm, as many persons suppose, but is just used to attract attention to anybody tampering with the box mischievously. To open a keyless box the handle should be turned to the right as far as possible, and then the inner door will be exposed and the alarm can be sent in as in the case of boxes with keys.

"Supposing that the person who sends the alarm should be required to leave the box before the first fire apparatus arrives, somebody ought to be asked to remain there, so as to inform the firemen of the exact location, as the box does not give that. The Fire Department should be notified of fire as early as possible, and then every means at hand should be used to extinguish or prevent the fire from spreading. Where water is used, as much surface of the fire as possible should be covered, and it also should be remembered that a small quantity of water judiciously distributed will stop a small fire quicker than a larger quantity thrown in one spot.

"A fire in the night is necessarily more dangerous than a day fire, because it generally gets a good hold before it is discovered, and paralyzes the senses of the persons in the house for the moment. If you should be awakened by fire and feel a sense of suffocation by smoke, you may obtain relief to some extent by lying flat on your stomach and holding the face close to the floor. Smoke and hot air ascend, and the coolest and freshest air is found nearest the floor. The windows should be lowered from the top and raised from the bottom, so as to allow accumulated smoke to escape from the rooms. A piece of silk or woolen cloth held over the mouth and nose will prevent suffocation for a short time, especially if it is wet or dampened.

"Persons should not waste any time by attempting to dress or in endeavoring to save anything. The simplest thing to do is to just wrap your blanket around you and get out the quickest way possible. The doors should kept closed, so that all draughts are prevented. One should bear in mind that blankets and sheets knotted together and fastened to any permanent fixture are a very effective means of escape. If all means of escape are cut off, the person in danger should try to retain presence of mind. There are few places in the city that cannot be reached in from one to four minutes at the most by fire apparatus, and, as all carry life-saving implements, it is but the work of a few seconds to get them in position. In the event of a person's clothing taking fire where help is at hand, the victim should be placed in a horizontal position at once and wrapped up in anything that will exclude the air. Women and children are more liable to suffer in this way than anybody else, and especial care should be taken in that case.

"The clothing of the person attacked by fire ought to be removed immediately after the flames are extinguished, and the injured parts bathed with linseed or sweet oil.

"The records of the department show that fires are caused principally by careless workmen, foul chimneys, defective flues, gas jets, fireworks, hot ashes, accumulation of rubbish, overheated furnaces and stoves, children and matches, electric light wires, and kerosene lamps or stoves. The department has recognized the inattention of most persons to keep themselves informed about fires, and highly colored cards are distributed which give the location of the nearest alarm box and instructions for sending in alarms. Persons are also cautioned to see that their stoves, heaters, lights, matches, and ashes are secure before closing up their stores or before retiring. A few minutes' thought will suffice for anybody who wants to be prepared, and it should be remembered that forewarned is forearmed."

### The Therapeutics of Oxygen.

Dr. A. W. Catlin, of Brooklyn, in a paper read before the Medical Society of the State of New York, recently held in Albany, stated that the therapeutic use of oxygen was of very recent date. The treatment of disease by natural means was proving more and more efficacious as experience increased. Oxygen was a distinct remedial agent—one that should not be left untried until the patient was *in extremis*. It was the surest and most satisfactory stimulant that we possessed, and was applicable to many conditions. In profound shock, from whatever cause, it had been found to exercise a reviving effect. It was taken up quickly by the blood, but its chief value was in its effect upon the nerve centers, upon which it exercised a quieting and soothing effect. In hemorrhage from typhoid fever he had seen relief in many cases. It would produce sleep, favor assimilation, and shorten the period of convalescence of typhoid fever. No agent was so well tolerated or so useful in restoring the equipoise of the physical condition. In cases of childbirth, pneumonia, bronchitis, and other exhausting diseases, the use of oxygen was indicated, and it should not be given late, but early.

PROF. LANGLEY demonstrates that if a body of coal sufficiently large to last the United States a thousand years should be set on fire, the heat given forth from it would not equal that which the sun gives out in the thousandth part of a second.

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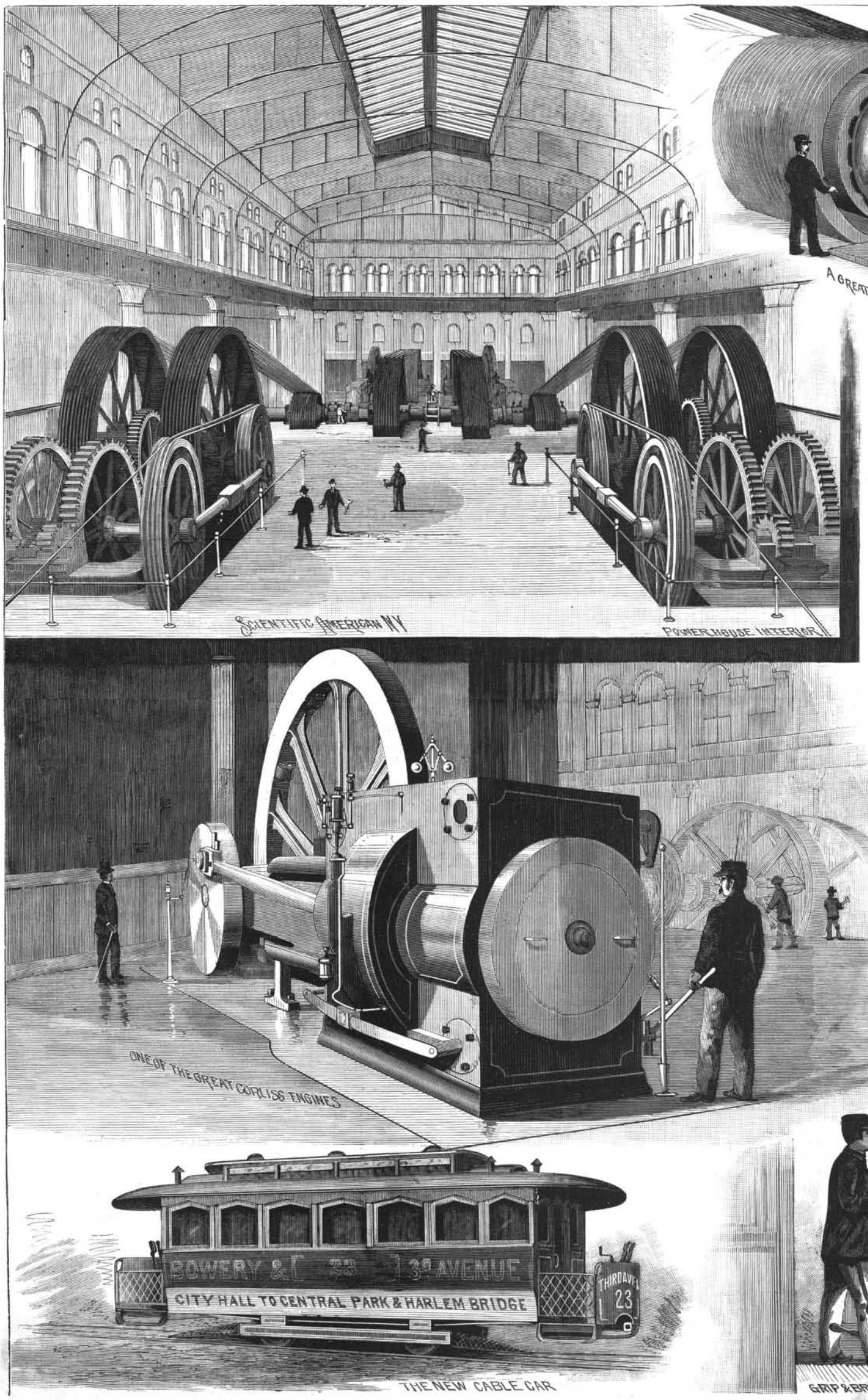


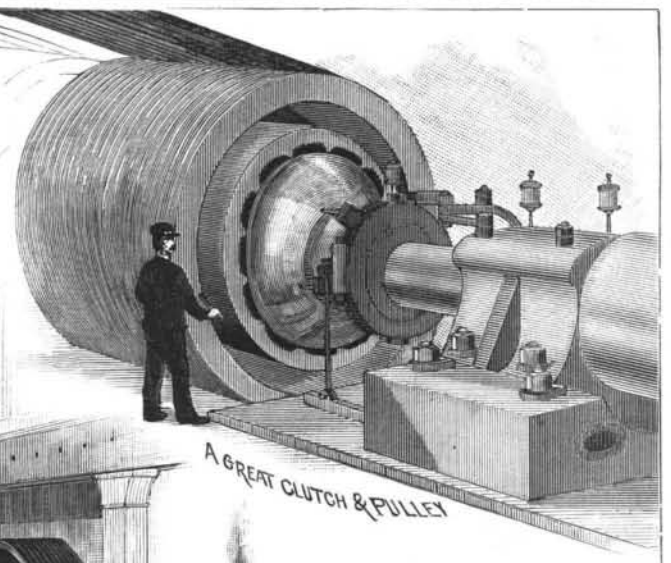


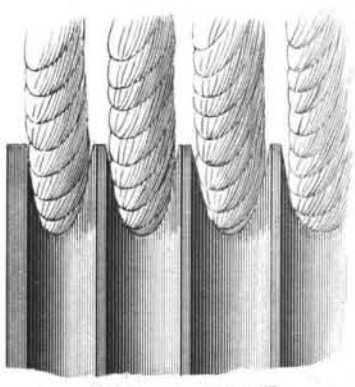


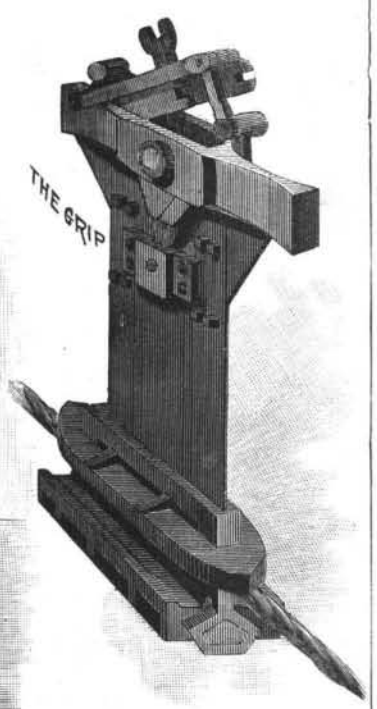


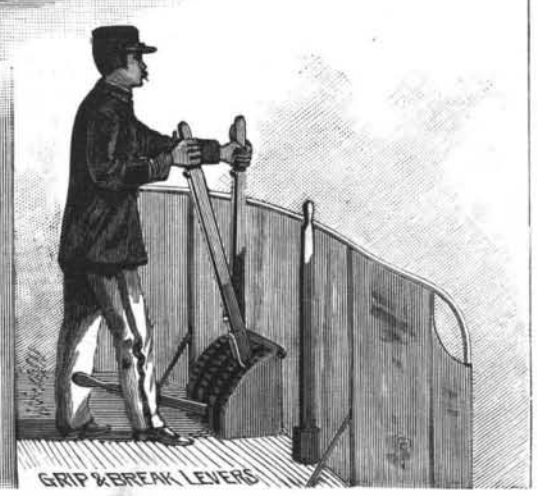


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