

thicknesses; the weight so produced is not to be exceeded, but a latitude of 5 per cent below this will be allowed for rolling in plates of half an inch in thickness and upwards, and 10 per cent in thinner plates.

These weights may be ascertained by weighing as much as 10 tons at a time.

TESTS FOR ANGLE, BULB, OR BAR STEEL.

The whole of the steel to stand a tensile strain of 26 tons to the square inch, and not to exceed 30 tons to the square inch. Also to stand the extension and tempering tests described for plate.

All the cross ends to be cut off. One bar is to be taken for testings from every invoice, providing the number of bars does not exceed fifty; if above that number, one for every additional fifty, or portion of fifty.

IMPROVED PROTECTED NON-RECOIL GUN.

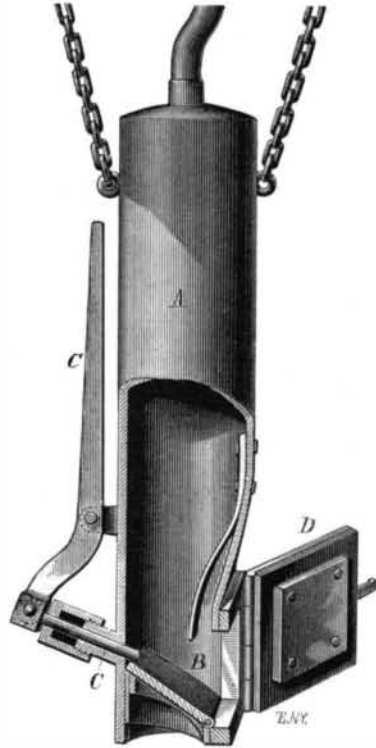
We are indebted to the *Engineer* for the annexed engraving and accompanying description of this invention. The object of the system is the complete protection of the gun detachment and of the gun itself, except at the muzzle. It is also supposed to insure accuracy of aim for a continuous series of rounds. The general idea is that the gun shall pivot at the muzzle in a ball and socket joint, fixed into the armour of a casemate, entirely closing the port and preventing recoil. Krupp claims that when once the gun is laid true on the object, it can be fired any number of times without recoiling, jumping, or otherwise changing its position or direction in the least; so that all error in shooting due to inaccuracy of laying is prevented when once the right direction is secured.

The drawing, Fig. 1, shows a section of a casemate for a 6 inch gun. The muzzle is enlarged to form a ball, A, which plays in a socket consisting of a steel port plug, B, into which is screwed a wrought iron cylinder, C, holding the ball of the muzzle firmly in the socket. On each side of the gun, trunnion, D, travels up and down a carrier, E, in which a slot is cut for the purpose. This carrier is fitted with a hollow soled truck, F, which permits the carrier to pivot on the racer, G, and so to accommodate the arc traveled through by the trunnion, when elevation is given, to the straight slot in the carrier. The truck also moves along the racer, G, when the gun is traversed. The casemate is composed of a thick wrought iron plate, H, in front, supported by strong box girders, K, and roofed with thin wrought iron plate, I. The lower portion is made of cast iron, J. It is protected from the enemy's fire by a glacis of concrete, L, in which is embedded a wrought iron glacis plate, M. A wrought iron shield, N, covers the muzzle of the gun when not firing. It rests on a trigger, O, so that when the gun is ready to be fired, the rope draws back the trigger and the shield falls. As soon as the gun is fired the shield is raised by the winch, P, acting in aid of the balance weight, Q, and the trigger is forced back to its place as a support by the spring, R. The sides of the casemate are built as of brick covered with wrought iron plates. They are all sloped as shown in Fig. 2 to cause shot to glance off.

IMPROVED PNEUMATIC DREDGING TUBE.

Our engraving represents a new pneumatic tube for dredging, mining, and wrecking purposes, which is worked by creating a vacuum and drawing the sand, earth, or other matter into the same. A represents the tube which is connected by a rubber pipe at the top, with an air pump on the vessel or float.

The lower end of the tube, A, is provided with a hinged inclined valve, B, that is fitted by rubber packing, hermetically, to a seat, and locked rigidly, when the tube has been lowered to the bottom, by a sliding bolt or key, C, which is guided in a stuffing box and operated by a lever.



A discharge door, D, is hinged to the side of tube near the bottom valve. A spring, at the inside of the tube, above the side door, serves to cushion the bottom valve when the same is opened for drawing in the sand or earth.

After the tube has been lowered and placed into position on the bottom of the river, the bottom valve being closed, and the air pumped out by the air pump until a vacuum is created, the key is withdrawn by the lever, and the sand or earth drawn into the tube until the same is nearly filled. The tube is then raised, and the contents discharged by opening the side door, the inclination of the bottom valve facilitating the discharge.

THE German government contemplate introducing the telephone into the telegraphic service, and are about to begin experiments upon it.

Progress of the New York Elevated Railroads.

When the elevated railroad on the west side of New York city is completed the termini will be South Ferry and Eighty-first Street. The total distance will be then six miles. Foundations for supporting columns are now being put down between Sixty-first and Eighty-first Streets, and the foundations necessary for making the track double between South Ferry and Sixty-first Street will be completed in a few days. Two fifths of the road are finished for a double track. The gauge is the standard one, 4 feet 8 1/2 inches, and the rails are Bessemer steel, 50 pounds to the yard. Rolling plant consists, at present, of 21 dummies and 39 passenger cars. The average number of passengers daily is 11,000. In 21 days of last month (November) there were 207,926 passengers against 139,768 in the same time of the corresponding month in last year, an increase of 68,157.

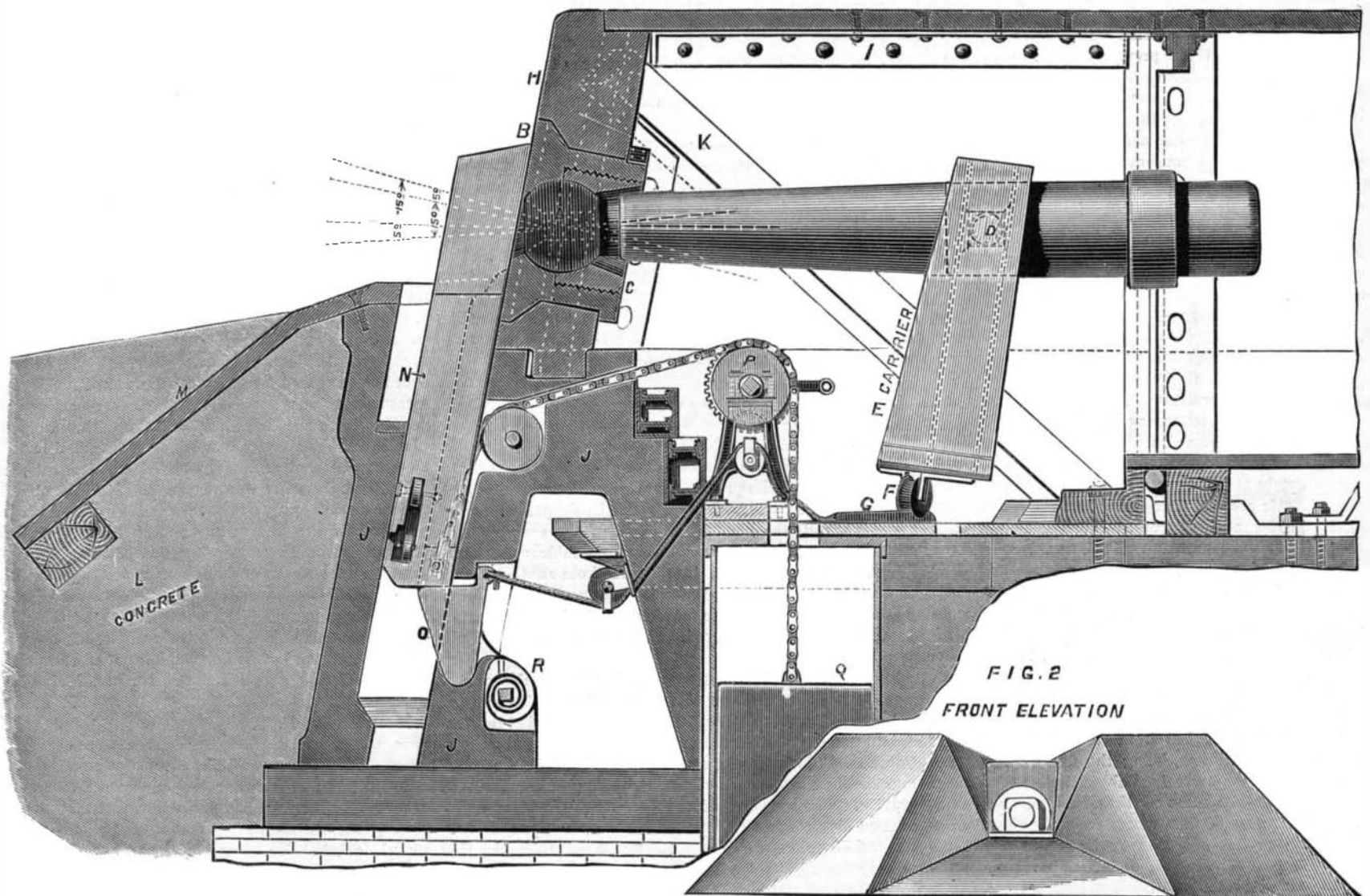
On the east side there will be a railroad from South Ferry to Sixty-first Street, having a double track all the distance. There will be branch roads: one to Fulton Ferry, another from Chatham Square to the City Hall and the end of the Brooklyn bridge, one to Thirty-fourth Street, and still another to the Grand Central Depot. The work on both sides of the city is progressing rapidly. An estimate of the cost by the chief engineer, for the double track on the east side of the city, from South Ferry to the Central Park at Sixty-first Street, 5 miles, with equipments, stations, and all the appointments necessary to its full operation, is \$1,625,000, or \$425,000 per mile. In this estimate is included sixty passenger cars, twenty-five dummies, eight stations to the mile, and engineering. The estimated numbers of passengers per annum is 14,700,000, and receipts, \$1,250,000.

New Agricultural Inventions.

Ladore V. Sikes, of East Otto, N. Y., has invented an ingenious cider-mill. It has two curbs, which move on rails. While the ground fruit is being pressed in one curb, a grinding mill is filling the other. The cake in the first is then taken out and the full curb moved under the press. The curbs are thus alternately changed from the grinding mill to the press, and thereby the grinding and pressing of the fruit and the making of cider is accomplished quickly.

Joseph R. Palermo, of Gonzalez, Texas, has invented an improvement on Cotton Seed Planters by which the seed is more readily supplied to the endless belt of the hopper. By an ingenious device motion is communicated from the rear roller of a band to a crank to a rock post, and cross bar which works a curved wire inside the hopper thus keeping the seed well stirred up.

E. M. Wilcox, of Whitewater, Wis., has invented a check-row attachment for corn planters by which a field can be planted in accurate rows. At the end of a shaft which revolves in bearings attached to the hopper is fitted a chain wheel, the teeth of which mesh into the links of a chain extended across the field. By an ingenious combination of a cylinder, cam groove, shoe and bars, the wheel revolves and the chain marks out the check row. This is a very useful and convenient improvement.



IMPROVED PROTECTED NON-RECOIL GUN.