

# SCIENTIFIC AMERICAN

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## EXCAVATING AND PIPE LAYING APPARATUS IN USE ON THE BROOKLYN AQUEDUCT.

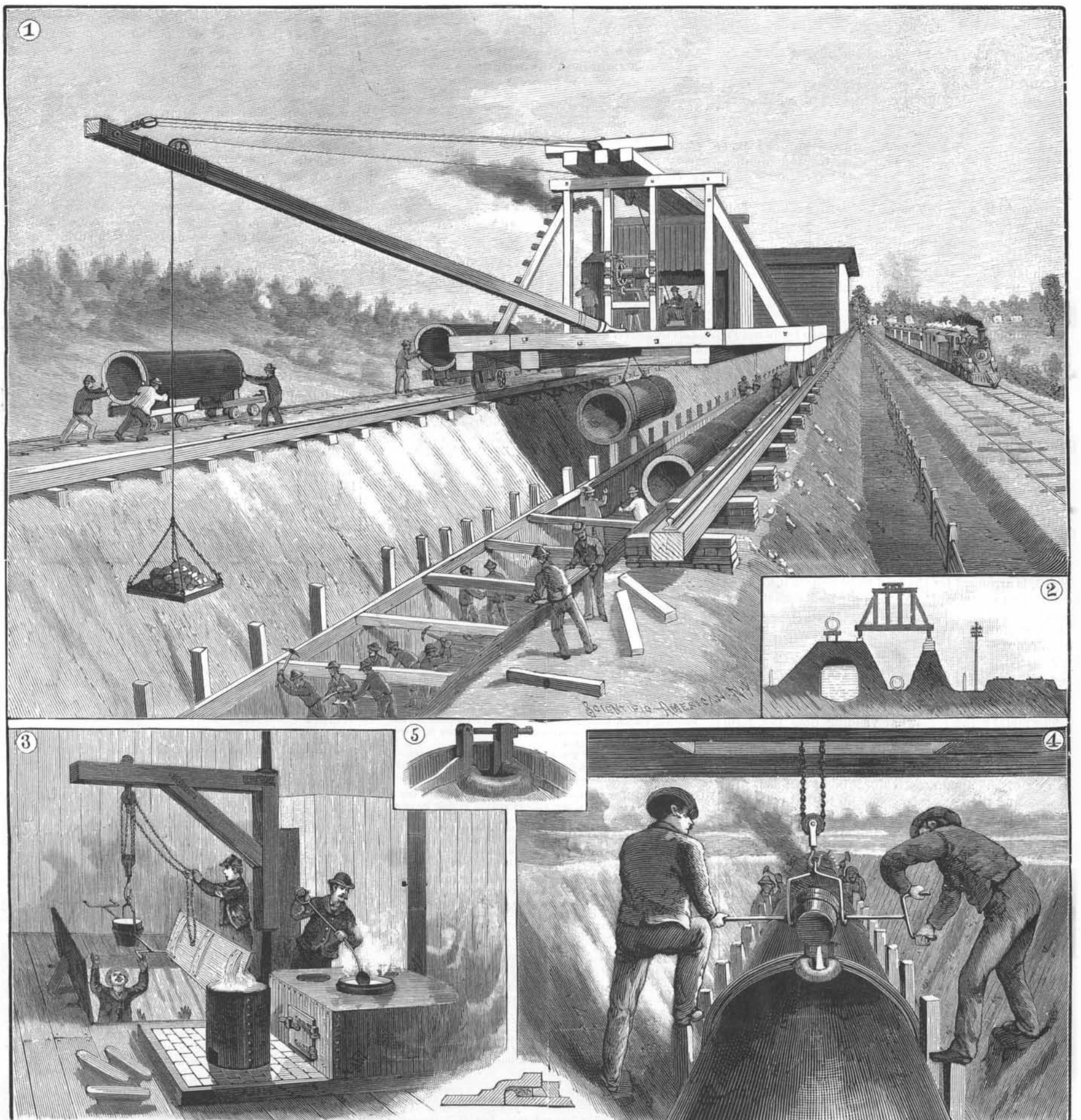
The operation of laying large pipe lines has hitherto been conducted by rather primitive appliances. The operations have generally been to a great extent manual, and little more than a derrick placed over the trench for swinging the pipes into place has been used in the way of machinery. The labor of laying such mains has been very severe, and progress necessarily slow, as the work is limited to one point of attack. To secure a consecutive line without sleeve connections the work must be advanced length by length, always in the same direction and without intermediate

portions being laid in advance. The apparatus we illustrate has been used with great success upon the Brooklyn, N. Y., water works, in laying a new line of forty-eight inch pipes. As the sections or lengths of pipe weigh from 7,000 to 8,000 pounds each, the capacity of the machine has been somewhat severely tested. It has, however, worked most successfully, laying from two hundred to three hundred feet per day.

The apparatus consists in general of a hoisting apparatus and crane followed by a lead-melting plant, all moving over the trench. The two are separate and independent of each other's movements. They are carried by rails, a single line of which runs along each

side of the trench. In advance of the whole arrangement the excavation is kept in progress. The trench diggers work as long as practicable by throwing the earth out by hand. As the depth increases, the crane carried in advance of the hoisting plant is brought into play. It is used to elevate the earth from the trench and to swing it to one side. This operation is shown in Fig. 1 of the engraving. As fast as necessary, the apparatus is moved forward on the rails by pinch bars.

Along one side of the trench a portable railroad has been laid. This serves for cars to run upon to carry off the dirt from the excavation where necessary, and



1. Excavating and pipe laying plant at work. 2. Section of aqueduct, new pipe line, and pipe laying plant. 3. Interior of lead melting plant. 4. Pouring a joint. 5. Arrangement of joint for pouring.

## EXCAVATING AND PIPE LAYING APPARATUS IN USE ON THE BROOKLYN AQUEDUCT.

to bring pipes to be laid in the trench. In Fig. 2 of the engraving the relations of trench, pipe-laying plant, and portable railroad are clearly shown.

The pipes, as fast as required, are run up to the scene of operations upon the portable railroad. The hoisting apparatus consists in general terms of a rectangular platform carried on four wheels and extending over and across the trench.

Slings are then placed round the pipe now lying on the skids over the aperture. Tackle is hooked on, and it is lifted a little by the steam windlass, and the skids are withdrawn.

The joint has next to be calked with oakum. This is driven by hand with a calking iron. It extends all around the pipe within the hub, and is of as even thickness as possible.

To complete the joint melted lead has to be introduced into the space in front of the oakum and the lead in turn has to be calked. As the apparatus just described is moved forward, the lead-melting plant seen in its rear is moved into its place.

The lead is lowered, as shown, into the trench, where it is received by the pipemen and poured into the joint, as shown in Fig. 4. Before doing this a band of iron hinged at the bottom is placed around the pipe and bolted at the top, so as to inclose the annular space in front of the oakum.

The lead at once solidifies. The band is removed, and the calkers attack the lead with large-faced calking irons and hammers and drive it home.

The metal being somewhat yielding does not form too rigid a connection, and allows for changes of temperature. In spite of numerous attempts, lead-calked joints have never been displaced.

The object of the line is to carry water from the new reservoir between Rockville Center and Baldwins, on the south side of Long Island, to the Ridgewood reservoir and new pumping station at East New York.

The work is being executed by Mapes, Crawford & Valentine, of Brooklyn, N. Y. They are the designers of the ingenious and efficient apparatus whose results have taken the direction of greatly accelerating the work we have described.

PROFESSOR ORTON, State Geologist of Ohio, says that the natural gas supply is rapidly and surely being exhausted. The way in which the gas is wasted makes the average stranger sick at heart.

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NEW YORK, SATURDAY, JANUARY 3, 1891.

Contents. (Illustrated articles are marked with an asterisk.) Aqueduct, Brooklyn, work on\* 1. Ants, white, in India 3. Bacillus of tuberculosis\* 7.

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 783.

For the Week Ending January 3, 1891. Price 10 cents. For sale by all newdealers.

I. ARMS OF WAR.—The Lebel and Mannlicher Guns.—The new German army rifle.—Its construction and arrangements for securing magazine action.—A comparison between it and the Lebel rifle of the French army.—6 illustrations. 12505

THE NEW CRUISER NEWARK.

On the 22d of December the new U. S. steel cruiser Newark had her official trial trip, and proved a great success, the contract requirements being exceeded by about five hundred horse power.

The Newark's hull is the same as that of the San Francisco, whose fine lines have commanded much admiration, and which was illustrated and described in the SCIENTIFIC AMERICAN of October 18, 1890.

The armament of the Newark will be twelve six inch breech loading rifles; four rapid fire guns, two three-pounders and two one-pounders; four revolving cannon and four Gatling guns.

OFFICIAL PROCLAMATION OF THE GREAT FAIR.

The last act necessary to start into booming activity the gigantic works pertaining to the great fair has been performed. The presidential proclamation has been issued, and soon we shall see holes in the ground and structures in the air.

"By the President of the United States of America: A proclamation: Whereas, satisfactory proof has been presented to me that provision has been made for adequate grounds and buildings for the uses of the World's Columbian Exposition, and that a sum not less than \$10,000,000 to be used and expended for the purposes of said exposition has been provided in accordance with the conditions and requirements of section 10 of an act entitled 'An act to provide for celebrating the 400th anniversary of the discovery of America by Christopher Columbus by holding an international exhibition of arts, industries, manufactures and the products of the soil, mine and sea, in the city of Chicago, in the State of Illinois,' approved April 25, 1890.

"Now therefore I, Benjamin Harrison, President of the United States, by virtue of the authority vested in me by said act, do hereby declare and proclaim that such international exhibition will be opened on the first day of May, in the year 1893, in the city of Chicago, in the State of Illinois, and will not be closed before the last Thursday in October of the same year.

"In testimony whereof I have hereunto set my hand and caused the seal of the United States to be affixed. Done at the City of Washington, this twenty-fourth