

(No Model.)

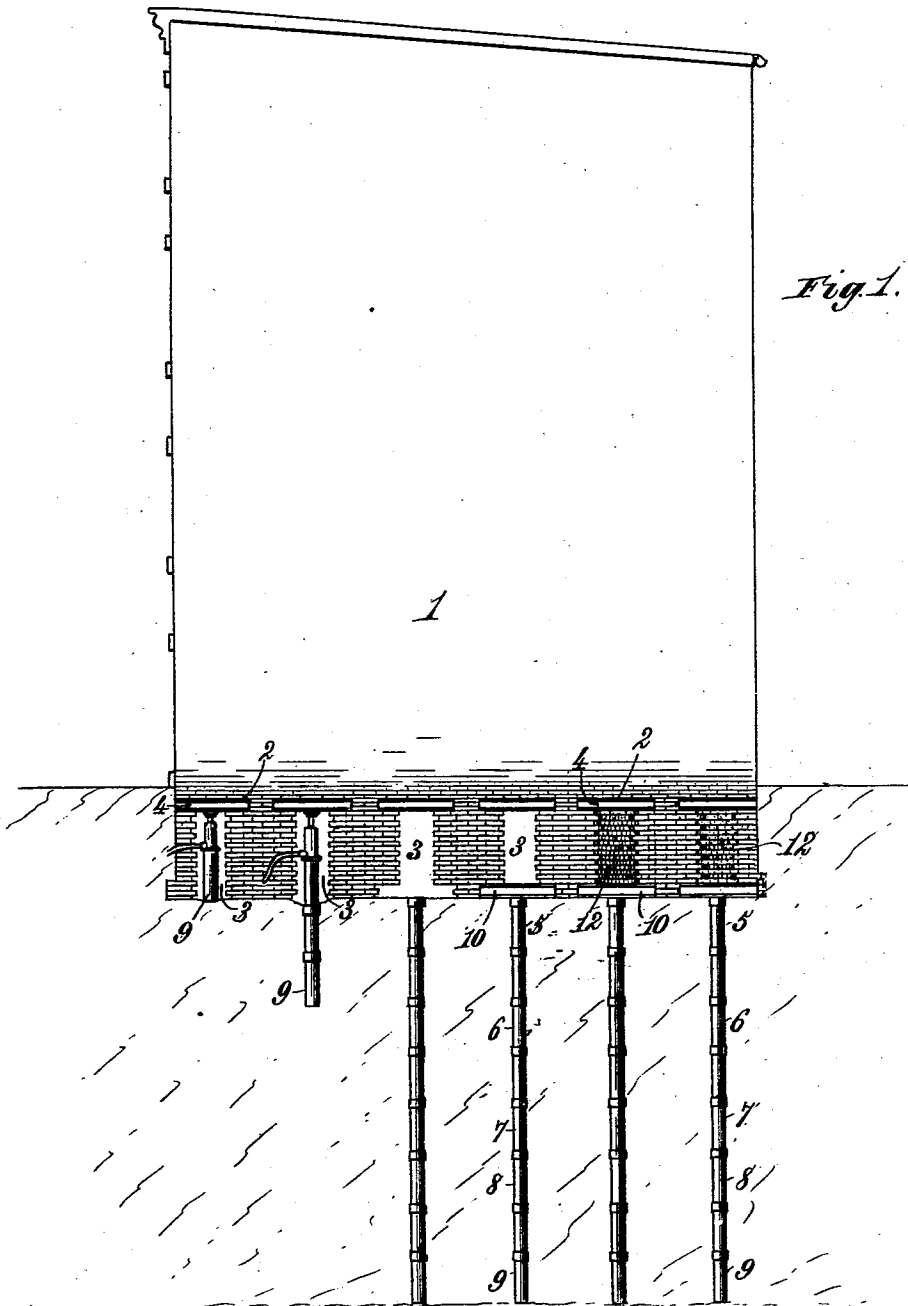
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J. BREUCHAUD.

CONSTRUCTION OF SUPPORTS FOR WALLS, &c.

No. 563,130.

Patented June 30, 1896.



Witnesses.
Robert G. Smith,
Samuel S. Smith,

Inventor.
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Atty.

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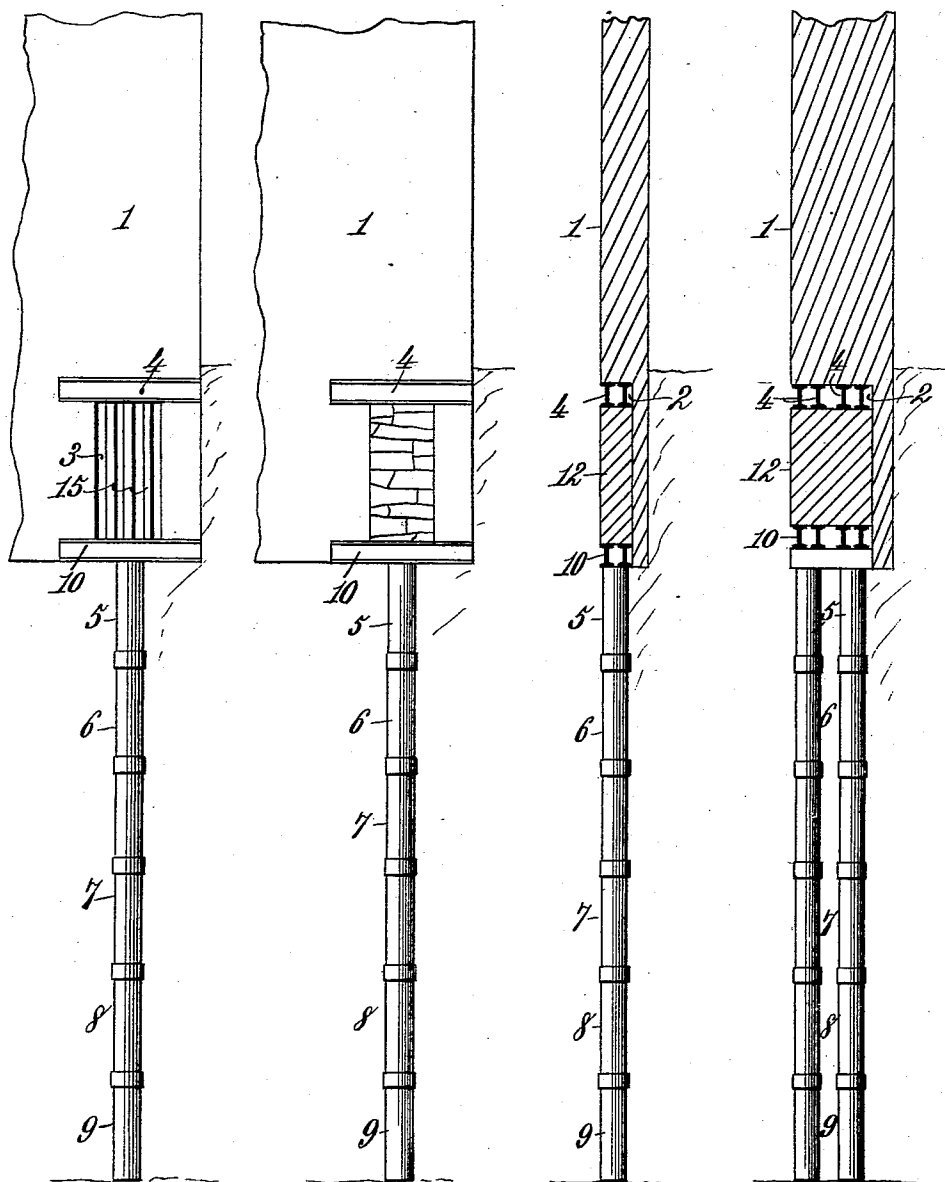
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Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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CONSTRUCTION OF SUPPORTS FOR WALLS, &c.

SPECIFICATION forming part of Letters Patent No. 563,130, dated June 30, 1896.

Application filed April 29, 1896. Serial No. 589,583. (No model.)

To all whom it may concern:

Be it known that I, JULES BREUCHAUD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Construction of Supports for Walls, &c., of which the following is a specification.

The chief object of the present invention is to improve the system of underpinning a heavy structure, such as a building-wall, for repairing the building, or constructing or erecting a subbase or foundation under the wall of a building wherever the foundation of a proposed new building is designed to extend below the foundation of the old or already-erected building.

The invention also has for its object to provide a new and improved system of constructing a subfoundation or support for the wall of a building or other heavy structure when the foundation or ground by which it is sustained is removed, whereby the underpinning can be effected at one side of a building-wall or other structure without interfering with the opposite side or with the interior of the building, which can therefore be occupied or used while the foundation or support for a proposed new building is being constructed or erected.

The invention also has for its object to provide new and improved means whereby a deep excavation for a new foundation can be practicably and safely made beside the wall of a building or other heavy structure already erected without endangering the safety of the latter or interfering with or obstructing the interior of the same, and without the employment of ordinary braces or supports, which usually obstruct the work in hand and materially interfere with or absolutely prevent the occupancy or use of the old or already-erected building or other structure.

The invention also has for its object to facilitate the construction of the foundation for a building, to enable the foundation to be more economically constructed or erected than heretofore, and to render it possible to safely erect a building with a foundation extending, comparatively, to a great depth below the surface adjoining a building having a comparatively shallow foundation while the

latter is occupied or used for business or other purposes.

The invention consists, primarily, in the method of constructing a subbase or foundation for the wall of a building or other structure by arranging hydraulic or other jacks in engagement with the base of the old wall and successively driving pipe, tube, or cylinder sections perpendicularly into the earth until the columns thus formed reach bed-rock or other firm substrata, then removing the jacks and filling in pressure-resisting connections between the upper ends of the columns and the base of the wall.

The invention also consists in the combination, with the wall of a building or other structure, of suitable beams inserted into the wall, hydraulic or other jacks or devices acting against the beams, and columns arranged in line with the jacks and acted upon by the latter, so that while the wall offers a resistance to jacks or other devices the latter drive the columns perpendicularly into the earth until they reach bed-rock or other firm substrata.

The invention also consists in the combination, with the wall of a building or other heavy structure, of suitable beams inserted into the lower portion of the wall, perpendicular columns driven into the earth until they reach bed-rock or other firm substrata, suitable beams arranged upon the upper ends of the columns, and masonry or other suitable pressure-resisting medium inserted between the upper and lower beams, whereby the wall is sustained by the columns, and it is possible to excavate below the former foundation of the wall for the erection of an adjoining new building or other structure.

The invention also consists in other features, which are hereinafter fully described in detail, and specifically pointed out in the claims, reference being made to the accompanying drawings, in which—

Figure 1 is a detail side elevation illustrative of the manner in which my invention is carried into effect. Fig. 2 is a detail elevation showing a modification in the construction of the pressure-resisting connections or mediums between the upper ends of the columns and the wall. Fig. 3 is a similar view showing another modification of the pressure-

resisting connections. Fig. 4 is a vertical sectional view, and Fig. 5 is a detail vertical sectional view showing a modification wherein two sets of columns are arranged to support the wall and constitute a subbase or subfoundation therefor.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The numeral 1 indicates the wall of a building or other heavy structure, which is to be underpinned or provided with a subbase or subfoundation according to my invention. This wall may be the wall of any building already erected and adjoining or next to which it is designed to erect a comparatively high or tall building or structure, the foundation of which it is necessary to extend to a greater or less depth below the original foundation or supporting-base of the wall of the old or already-erected building or structure.

In the erection of a comparatively heavy or high building or other structure adjoining an old or already-erected building or structure, it may be necessary to excavate below the foundation of the old wall, and ordinarily the old wall is sustained by braces, shoring-blocks, or other supports, which occupy considerable space and obstruct the side of the wall opposite the side presented to the proposed new building. Frequently, if not always, the underpinning-braces, shoring, or supports, as ordinarily employed, obstruct the execution of the work in hand, and materially interfere with the occupancy or use of the old or already erected building for business or other purposes. This is very objectionable, particularly in business portions of a large city, where space is a matter of importance, and where it is very desirable to repair a building or erect an adjoining building without interfering with the occupancy or use of the old or already-erected building or other structure. This I accomplish economically and with facility in the following manner:

After determining the number of columns necessary to produce in the best manner the subbase or subfoundation or support for the old wall of a building or other structure, I construct in the outer side of the old wall a number of horizontally-arranged recesses 2, corresponding in number to the number of columns which is to constitute the subbase or subfoundation, and from these horizontally-arranged recesses I cut, or otherwise suitably produce, the vertical or perpendicular recesses 3. If the old wall is of brickwork, the recesses referred to can be easily produced by simply removing some of the masonry. If the old wall be of stonework, the recesses may be cut into the stonework, or, if practicable, some parts of the stonework may be removed for the purpose stated. In each horizontally-arranged recess 2 is ar-

ranged a beam or beams 4, which may be an I-beam, of metal, or a beam of any suitable material, and of any desired form in cross-section. A hydraulic or other powerful jack is arranged vertically in one of the recesses, so that the ram of the jack bears against the beam 4 of this recess. The hydraulic jack, in a perpendicular position, is employed to drive the columns perpendicularly into the earth until these columns reach bed-rock or other firm substrata or solid foundation, an important feature being that the superincumbent weight of the old wall offers the resistance which enables the jack to drive the columns.

The columns are preferably composed of iron, but they may be made of any metal or material suitable for the purpose in hand, and each is composed of a plurality of sections, as, for instance, the sections 5, 6, 7, 8, and 9. Commencing, for example, with the first section 9, it is placed under and in alignment with the jack, and the latter is then operated to drive this section perpendicularly into the earth. The next section, as at 8, is then attached to the upper end of the section 9, and the second section is operated upon by the jack, so that it, with the other section 9, is driven perpendicularly into the earth, and this operation is proceeded with until the number of sections constituting the column are driven into the earth to the depth necessary to reach bed-rock, or other firm strata. During this order of procedure the superincumbent weight of the building-wall resists the pressure of the jack and enables the latter to exert a powerful pressure in driving the column-sections downward in the manner stated. After the number of sections necessary to constitute the desired length of column has been forced into the earth, the hydraulic jack is removed, and a beam 10 is placed upon the upper end of the column, and the recess 3 is filled up with brickwork, as at 12, or other material, to fill in the recess and make a practicably integral part of the wall, which filling extends from the beam 10 to the beam 4. The beams 4 and 10, and intermediate filling 12, constitute a pressure-resisting connection between the upper end of the column and the base of the old wall, and this pressure-resisting connection or medium is, in effect, built into and forms a part of the old wall, so that, when a plurality of columns are driven into the earth and connected with the wall in the manner above explained, a permanent subbase or subfoundation is provided which will firmly and safely support the wall of the old or already-erected building or structure while excavations are being made below the original foundation of the old wall for the purpose of constructing a foundation for a proposed new building adjoining or next to the old building, or for any other purpose.

It is unnecessary to explain in detail the sinking of each column, because the descrip-

tion above given of the manner of driving one column and connecting its upper end with the base of the wall of the old building or other structure is sufficient to enable those skilled in the art to understand the manner of sinking all the columns and connecting them with the wall.

It will be obvious that two columns can be driven simultaneously by the employment of two jacks arranged, respectively, in two of the recesses 3, and in fact any number of columns could be driven at the same time. It is possible to employ an ordinary water or water and air jet to aid in sinking the columns, as is usually practiced in sinking cylindrical bodies, as, for instance, in sinking caissons in preparing foundations for bridges, piers, and the like.

The sections composing each column are made in the form of cylinders, pipes, or tubes, and preferably they are circular in cross-section. This construction renders it possible to use the water-jet to aid in sinking the columns, and after the columns have been sunk to the desired depth, if the earth contained within the tubular columns is removed, these columns may be reinforced by filling them with concrete, cement, masonry, or other filling material, but this is not indispensable.

In the operation of driving or sinking the column-sections, after the plunger or ram of the jack has reached the limit of its outstroke, blocking and jacking are resorted to until a column-section is driven such distance that there is a space sufficient to insert another column-section, which can be connected with the previously-driven section, and then in turn be driven in the same manner as the first-mentioned section, and so on for any number of sections which it is necessary to drive into the earth for the purpose of reaching the desired depth. When the column-sections have been driven to secure the required length of supporting-column, it will appear as shown in Fig. 2.

The provision of the horizontally-arranged beams is important, in that they render it possible for the superincumbent weight of the building to serve as a fulcrum or resistance for the jack without any danger whatever of cracking, splitting, or otherwise rupturing the old or already-erected wall; and, further, when the pressure-resisting connections between the wall and the columns are completed, the horizontally-arranged beams distribute the weight and secure the best results, whereby my improved system of underpinning is rendered advantageous, the erection of the subbase or subfoundation is greatly facilitated, the inconvenience attending the ordinary methods of shoring and underpinning is avoided, and the cost is reduced, in that the subbase or subfoundation can be constructed and the foundation for an adjoining building laid or erected without obstructing or interfering with the occu-

pancy or use of the old or already-erected building for business or other purposes.

In Fig. 1 the filling built into the vertical recess 3 is or may be of brickwork; but in the modification Fig. 2 the filling is composed of a plurality of vertically-arranged beams 15, which may be of wood, iron, or steel; while in the modification Fig. 3 the filling is, or may be, composed of stonework laid to break joints. As regards the filling, however, I do not wish to be understood as confining myself to any particular material or substance, as this may be changed or varied to suit the conditions required, according to the nature of the building or the work in hand.

In the modification Fig. 5 there is represented two rows of supporting-columns, which arrangement is desirable where an unusually heavy or large building-wall is to be supported. The rows may be increased to any extent desired or necessary to secure a safe subbase or subfoundation.

The number of columns driven into the earth to reach bed-rock or other substrata will depend on circumstances, and therefore I wish it understood that the number of columns may be increased or diminished to any desired extent.

Having thus described my invention, what I claim is—

1. The method herein described of constructing a subbase or foundation for a building-wall, or other structure, which consists in arranging a hydraulic jack in engagement with the base portion of the wall, and successively driving column-sections perpendicularly into the earth until a column is formed which reaches bed-rock, or other firm substrata, then removing the jack, and subsequently forming a pressure-resisting connection between the upper end of the column and the base portion of the wall, substantially as set forth.

2. The combination with a building-wall, or other structure, of beams inserted into the wall, hydraulic jacks acting against the beams, and column-sections alined with the jacks and driven by the latter into the earth until bed-rock, or other firm substrata, is reached, said wall constituting a resistance to the jacks while they are driving the column-sections perpendicularly into the earth, substantially as described.

3. The combination with a building-wall, or other structure, of beams inserted into the lower portion of the wall, perpendicular columns driven into the earth under the wall, beams arranged on the upper ends of the columns, and a filling interposed between the beams on the columns and the beams inserted into the wall, substantially as described.

4. The combination with a building-wall, or other structure, having horizontally and vertically arranged recesses in its base portion, of perpendicular columns driven into

the earth under the recessed portion of the wall, beams arranged on the upper ends of the columns, beams arranged in the horizontal recesses of the wall, and fillings inserted into the vertical recesses of the wall between the beams on the columns and the beams in the horizontal recesses, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JULES BREUCHAUD.

Witnesses:

CHARLES L. MALCOLM,
J. KENNARD THOMSON.