

J. B. GOLDSBOROUGH.  
 METHOD OF UNDERPINNING BUILDINGS AND OTHER STRUCTURES.  
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1,085,600.

Patented Feb. 3, 1914.

Fig. 1.

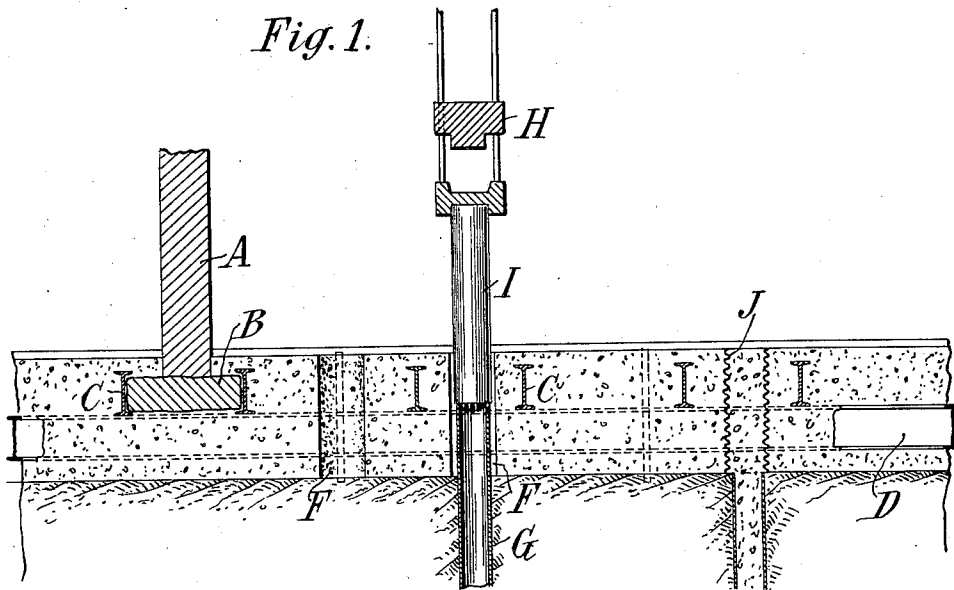
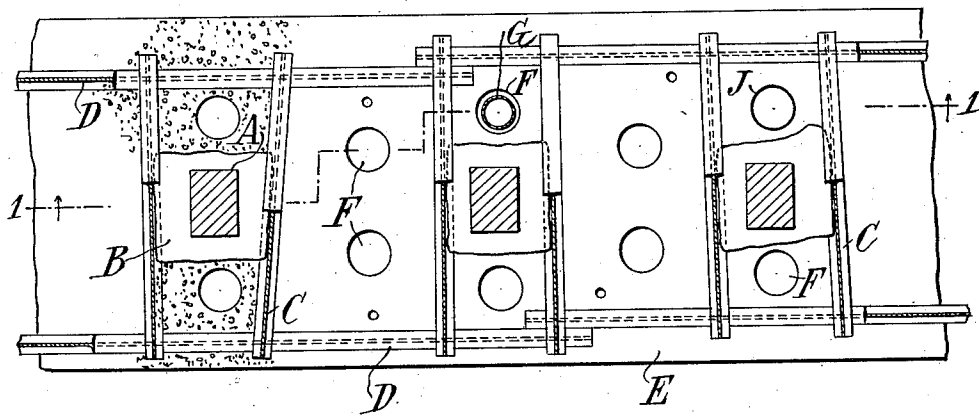


Fig. 2.



WITNESSES:  
*Rene Spuine*  
*Bred Whitey*

INVENTOR  
*John B. Goldborough,*  
 By Attorneys,  
*Fraser, Turk & Myers*

# UNITED STATES PATENT OFFICE.

JOHN B. GOLDSBOROUGH, OF CROTON, NEW YORK.

METHOD OF UNDERPINNING BUILDINGS AND OTHER STRUCTURES.

1,085,600.

Specification of Letters Patent.

Patented Feb. 3, 1914.

Application filed August 26, 1912. Serial No. 717,155.

To all whom it may concern:

Be it known that I, JOHN B. GOLDSBOROUGH, a citizen of the United States, residing in Croton, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Methods of Underpinning Buildings and other Structures, of which the following is a specification.

10 My invention relates to a method of underpinning buildings or other structures, and has for its object to provide means whereby the foundation may be extended to a lower or more secure sub-strata without 15 undermining the footing of the wall. According to my invention the footing of the wall, whether it be supported on an integral footing or on isolated footings, as would be the case if the wall rested on piers, is 20 extended laterally and openings are formed in such extension through which openings columns are driven into the earth beneath the footing, which columns are then suitably secured to the footings and become part of 25 the foundations and effectually transfer the load or a part thereof to a lower strata.

In the accompanying drawing there is illustrated one of many modes in which my invention may be employed.

30 Here Figure 1 illustrates in elevation, parts being shown in section, a portion of the foundation of a building which in this instance is illustrated as resting upon piers or columns. In this figure a column is 35 shown as being driven through one of the openings in the extension of the footing. Fig. 2 illustrates the footing in plan view the piers being shown in section and parts of the beams and footing.

40 I have illustrated my invention as applied to a building, one wall of which is illustrated as supported on piers or columns A which rest upon stone footings B. It 45 will, of course, be understood that this is only illustrative and that the invention may be employed equally well for providing a new foundation or underpinning for the wall of a building or other structure whether supported on piers or columns or 50 whether the wall is integral.

In the particular embodiment of the invention illustrated the I-beams C are ar-

ranged transversely of the row of piers or columns A and are located with one of their bottom flanges in engagement with 55 the footings B, preferably by excavating the soil to the base of such footing B and by inserting the flange of the said I-beam under the said footing. Longitudinal beams D, for which purpose I-beams may also be 60 well employed, may then be inserted under the ends of the I-beams C and when this has been done the footings may be extended by placing a bed of concrete about the said footings B and of such area that the beams 65 C and D shall be embedded therein. Thereby the weight of the building wall will be transferred through the I-beams C and D to the new footing which as a whole I designate E, and the said extended footing E 70 will be strengthened and reinforced by the presence of such beams and will form a rigid, integral footing of great strength.

The process as so far described is not separately claimed in this application but is 75 made the subject of a separate application for patent filed by me August 26, 1912, Serial No. 717,154.

The present invention relates to the means whereby a new foundation may be carried 80 to a greater depth without undermining the footing E or in any way impairing or destroying the stability thereof. This operation is frequently required in cases where the support of the soil which origi- 85 nally was sufficient to carry the load, is impaired by reason of an adjacent excavation below the depth of the original footing. This is particularly necessary in cases where such adjacent excavation goes be- 90 low water level whereby the water is drained from the soil and the sustaining power thereof is decreased.

According to my invention I provide means for carrying the foundations to a 95 greater depth without undermining the footing B, or making the use of needling, shoring or other bracing to support the foundation during the underpinning, by constructing openings F in said footing E from the 100 top to the bottom thereof, and preferably during the process of forming the said footing. After the footing has properly set columns G are inserted in the said open-

ings and driven into the earth beneath the same. In case headroom is lacking or the columns require to be driven to a considerable depth sectional columns may, if desired, be employed. The said columns may be integral columns or they may be hollow columns—in either case they may be joined together by any of the usual couplings employed for this purpose. A water jet may, if desired, be employed to aid in sinking the said columns. In case hollow columns are employed they will preferably be cleaned out as by jetting, and filled with concrete after they are sunk. For the purpose of driving the said columns suitable means may be employed,—a steam hammer H is well adapted for this purpose and is particularly useful where headroom is lacking.

A follower may, if desired, be employed to aid in driving the columns through the concrete footing E. When the said columns have been driven to a proper depth and have reached a strata which is capable of rendering the necessary support, they are connected to the footing E so as to bear their desired load. A desirable manner of effecting such connection is illustrated. Here a corrugated sheet metal casing J, preferably round in cross-section, is provided, which is located in place before the concrete is formed. The concrete sets around this, entering into the corrugations so as to be bonded firmly therewith, and provides the opening F. When the column G has been driven to the proper depth the said corrugated form J is filled with concrete well rammed onto the head of the column G, and this, when set, affords a most efficient connection between the concrete footing E and the said column G and effectually transfers the desired load to the said columns.

Any desired number of columns F may be employed and they may be situated in any desired position. The footing E by reason of its thickness and of the reinforcement provided by the I-beams possesses great strength and the columns G may safely be located at any desired part thereof.

A desirable use of the foregoing method is in connection with the underpinning of buildings or other structures whereby as stated the great advantage is accomplished that a new and deeper foundation may be provided, without undermining the original foundation. This is an object greatly to be desired as thereby the foundation is not weakened and I am enabled to install new and deeper foundations before the adjacent operations have proceeded to a sufficient depth to impair the stability of the soil. Thereby also the very desirable end is achieved that the underpinning is accomplished without resorting to any temporary supports of the structure being underpinned,

such as needles, braces, shores and the like. The employment of such temporary supports is always attended with danger in that the weight of the structure being underpinned is required to be transferred to such temporary supports, and later when the new foundation is prepared to be again shipped to such new foundation. Frequently such new foundations are not provided until the adjacent operations are completed, which may cause the structure to be supported on temporary supports in such cases for months, requiring a constant readjustment of the supports as the supporting power of the earth decreases, and frequently leading to a settling of the structure, if not to dangerous results. A desirable advantage furthermore renders it the fact that my method furnishes practically no obstruction of the work in hand on the adjacent operation, and likewise occasions no interference with the use and occupancy of the structure being underpinned.

My said method is not only applicable to the underpinning of an already erected structure, but may with great advantage be employed in the creation of foundations for new structures. In such use the openings F will be formed in the foundation, when placing the concrete or similar material forming such foundation, and the operation will be as before described. In many cases the concrete footings of buildings are supported on piles driven before the footing is placed. In some instances it will be of great advantage when preparing such new foundation, to drive the piling after placing the masonry forming the footing of the new structure. For instance in making a trench in treacherous ground, it is often difficult to maintain this trench owing to the shock and disturbance caused by driving the piles. In such cases it would be a decided advantage to employ my method, whereby the concrete or other masonry footing could be formed in the trench, and when set the piling could be driven through the holes therein and connected thereto, as above described. A decided advantage flowing from the use of such method in said foundations for new structures, would be that the open trench would have to be maintained for a shorter time, thereby in many cases materially reducing the cost of sheeting and bracing, as where piling is to be driven in an open trench, the sheeting and bracing must necessarily be of a stronger construction than when the concrete or other masonry is to be deposited or placed as soon as the excavation is ready.

A further advantage is gained in that it is easier to move the pile driving apparatus over a solid masonry footing than to move the same apparatus over an open trench. It would not only make a more secure founda-

tion for the apparatus to travel on, but in most cases the placing of the masonry would permit of the removal of the shoring and bracing that would otherwise obstruct the free movement and operation of the pile driving apparatus.

Modifications may be made in the steps herein described and equivalent devices and apparatus employed within the limits of the appended claims.

What I claim is:—

1. The method of underpinning a building or other structure which consists in constructing a new footing of concrete or the like connected to the base portion of the building, in forming vertical openings through such footing, in driving columns into the earth through such openings and in connecting said column to said footing.

2. The method of underpinning a building or other structure, which consists in constructing a new footing of concrete or the like, connected to the base of the building, in leaving vertical openings in such footing extending through the same during the process of construction, in driving columns into the earth through such openings, and in connecting said columns to said footing.

3. The method of underpinning a building or other structure which consists in constructing a new and enlarged footing of concrete or the like connected to the base of the building, in leaving vertical openings in such footing extending through the same during the process of construction, in driving columns into the earth through such openings, in interposing followers on such columns whereby they are driven into such openings, and in connecting said columns to said footing.

4. The method of underpinning a building or other structure resting on piers or columns, which consists in arranging supporting members in engagement with the base portion of such piers, in placing a bed of concrete or the like about such piers and embedding such supporting members therein, in forming vertical holes through such concrete, in driving columns into the earth through such holes and in connecting said piles to said bed of concrete.

5. The method of underpinning a building or other structure resting on piers or columns, which consists in locating I-beams with their flanges in engagement with the base portion of said piers, in placing a bed of concrete or the like about such piers and embedding such I-beams therein, in forming vertical holes through such concrete during the construction thereof, in driving columns into the earth through such holes and in connecting said piles to said bed of concrete.

6. The method of underpinning a build-

ing or other structure, which consists in constructing a new footing of concrete or the like, and connecting the same to the base portion of the building, in forming vertical holes through said footing during construction and lining the same with corrugated metal, in driving columns into the earth through such openings and in then connecting said columns to said footing by filling said openings with concrete or the like.

7. The method of underpinning a building or other structure, which consists in extending the footings of the foundations laterally, and connecting the said extensions to the original footing, in forming holes through the said extensions during construction, in driving columns into the earth through said holes and in then connecting said columns to said footings.

8. The method of forming a foundation for a building or other structure, which consists in constructing a footing of concrete or the like, in forming holes through said footing during construction, and in then driving columns into the earth through such holes and in then connecting said columns to said footings.

9. The method of underpinning buildings without any substantial undermining of the original foundation, which consists in constructing a new and enlarged footing of concrete or the like at the base portion of the foundation thereof, in providing vertical openings through such footing, in locating columns in the earth through such openings and connecting the said columns to said footing.

10. The method of underpinning buildings without any substantial undermining of the original foundation, which consists in constructing a new and enlarged footing of concrete or the like at the base portion of the foundation thereof, in providing vertical openings through such footing having uneven walls, in locating columns in the earth through such openings and filling said openings over the head of said column with concrete or the like and thereby connecting the said columns to said footing.

11. A foundation for a structure comprising a footing extending beyond the structure to be supported, of concrete or the like and of openings therein extending from top to bottom thereof adapted to permit underpinning columns to be driven there-through, said openings having uneven walls whereby a connection may be formed between said columns and said footing.

12. A foundation for a structure comprising a footing extending beyond the structure to be supported formed of concrete or the like, having portions at intervals in which the original concrete of said footing is absent from the upper to the lower surfaces

thereof, supporting columns located in the earth beneath said portions of said footings and connections from said columns to said footing, which connections are located over  
5 the tops of said columns and engage said footing so as to transfer a load to said columns.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

**JOHN B. GOLDSBOROUGH.**

Witnesses:

**MARTIN B. MEAGHER,  
ALPHONSE JARVIS.**

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**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."**

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