

J. B. GOLDSBOROUGH.
METHOD OF UNDERPINNING BUILDINGS.

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1,129,192.

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Fig. 1.

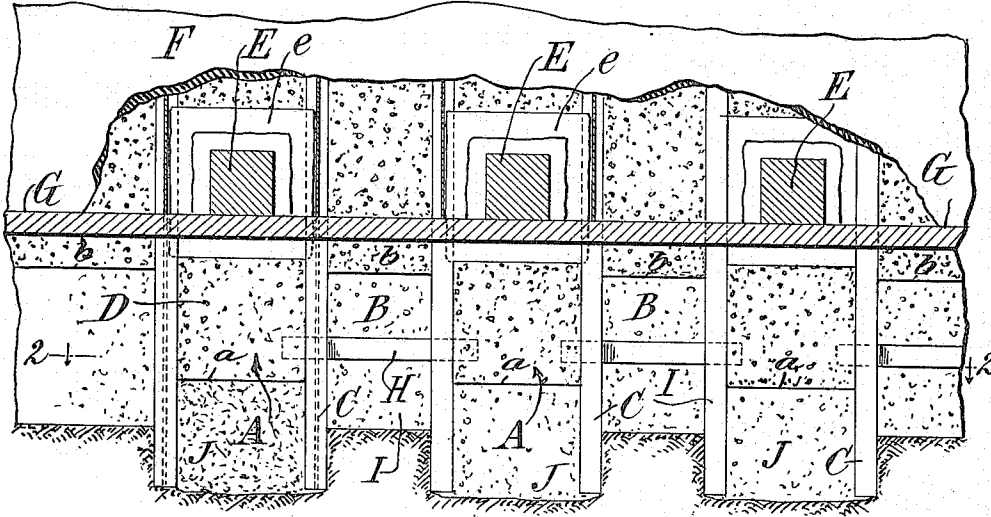
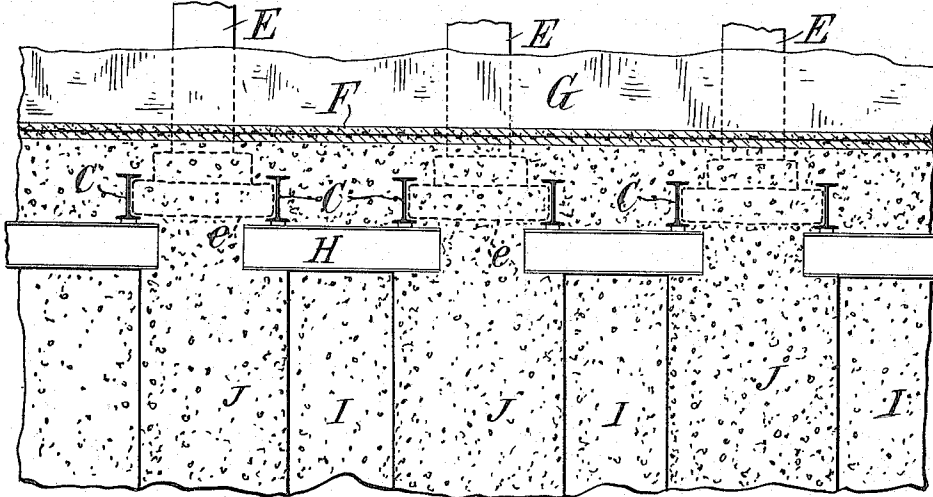


Fig. 2.



WITNESSES:

Rene Guine
William F. Martinez

INVENTOR :

John B. Goldsborough,

By Attorneys,

Frederick M. Mufles

UNITED STATES PATENT OFFICE.

JOHN B. GOLDSBOROUGH, OF CROTON, NEW YORK.

METHOD OF UNDERPINNING BUILDINGS.

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To all whom it may concern:

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

My invention relates to the underpinning of buildings or other structures, and is particularly available for use in connection with the underpinning of buildings which are supported on isolated piers or columns, and wherein in connection with the underpinning a new and extended footing is to be provided.

An important object of my invention is to provide an underpinning for such structure without undermining the foundation, and without depriving the soil of its supporting power.

A further object of my invention is to underpin the building or other structure without the employment of temporary supports for the structure being underpinned, and without the necessity of employing needles, shores, stays or braces.

A further object of my invention is to provide a new foundation or underpinning for a structure without interfering with the interior of the structure being underpinned, and to do so by means which do not materially obstruct the work in hand.

According to my invention an extended footing is provided which is constructed with alternate recesses and projections. In these recesses suitable columns are located in the soil, for which purpose I preferably form a pit, which is then filled with concrete or like material forming a column, which is then connected to the foundation so as to take a load. Columns are then formed between these first located columns whereby a curtain wall is formed.

The majority of commercial buildings in large cities are supported in whole or in part upon piers or columns having isolated footings, and these footings are usually located at suitable distance, from 12 to 15 feet below the curb, and have ample supporting power if the soil is undisturbed. It frequently happens that owing to adjacent excavations, which are deeper than the original footings, the supporting power becomes disturbed. Particularly is this the case

where such excavations extend below water level, whereby the water is drained from the soil. Also it frequently happens that the load to be supported by the foundations is materially increased. For this and other reasons it becomes desirable to provide new and deeper foundations or underpinnings for the said structure, and these are provided according to my invention in a manner which I will presently describe, and whereof one embodiment is illustrated in the accompanying drawings, wherein,—

Figure 1 is a plan view partly in section illustrating the employment of my invention; Fig. 2 is an elevation partly in section on the line 2—2 of Fig. 1.

In the employment of my invention, the original footing or footings of the structure are preferably extended laterally. This extended footing, which as a whole I designate D, has on its side a series of projections A alternating with recesses or inlets B, and having the outline *a b*. The said extended footing may well be formed of concrete, and includes suitable means for connecting it to the erected structure, such as supporting beams C. These supporting beams C are preferably arranged transversely of the structure, and are suitably located so that they shall engage the base portion thereof and receive the weight therefrom and transmit it to the new foundation. These beams are preferably embedded in the new foundation, so that when the concrete has properly set the new extended foundation D is provided. This is illustrated as extending on both sides of the wall, but the extension rearwardly may if desired be omitted.

In the instance illustrated in the drawings, the building is supported on three piers or columns E, each of which has an original footing *e*. The floor F extends substantially up to the said piers or columns E, and immediately in front or outside of the said piers or columns is located a partition wall G.

According to my invention the structure upon the piers or columns E and the extended footing D may be underpinned and provided with a new foundation at a deeper level without intruding inside of the partition G or disturbing the floor F. I find it desirable in this connection to prepare the extended footing whereby the original footings E are bonded together in accordance

with an invention described and claimed by me in Reissued Patent No. 13610, dated August 26, 1913. According to this invention the earth is removed between the original footings *e* to the level of their foundations. Thereupon the supporting beams *C*, which may well take the form of I-beams, are located transversely of the wall and in supporting position relative to the base portion thereof. This may well be accomplished by inserting the lower flanges thereof under the footings *e*. This having been accomplished, a mass of concrete is located in position about and between the original footings *e*, so that the I-beams are embedded therein, whereby when the concrete is set, the new extended and unitary footing *D* is provided, which not only enlarges the area of the footing but bonds the original footings *e* together into one single footing. This has great rigidity and supporting power. According to my present invention the said extended footing *D* is provided with means whereby the same may readily be connected to new underpinning elements located in adjacent position, and whereby the said extended footing is so constructed that the said underpinning elements may be located in the earth in suitable supporting position without undermining the foundations. These objects may well be accomplished by constructing the said extended footing *D* with alternate projections *A* and recesses *B*. After the footing *D* has been constructed, I preferably form a pit in the earth beneath each of the recesses *B* which may if desired be sheeted down, and which will be extended to a suitable depth, which may be either to a strata of increased bearing, such for instance as hard pan or rock, or to a depth below the level of the adjacent excavations. This having been done, a column is constructed in the said pit, and preferably the said column is formed of concrete or the like of such dimensions as to fill the said pit. The upper end of the said column is then connected to the footing *D* in suitable manner by a pressure resisting connection so as to take a load. This connection may well take the form of a supporting beam, such as an I-beam *H*, preferably located perpendicular to the I-beams *C*, and which may well be arranged as illustrated in the drawings, wherein the said supporting beam *H* extends under two of the said I-beams *C*. When the columns *I* have thus been installed and connected to the structure to be supported, they will preferably project to a substantially equal extent on both sides of the distributing beam *H*, providing an even bearing upon the column *I*. This will cause the outer ends of the column to project somewhat beyond the footing *D*.

For many purposes it is desired to pro-

vide a continuous underpinning wall which may serve as a curtain wall. This I accomplish by sheeting down pits in the space between the projecting parts of adjacent columns *I*, and in the said pits constructing like columns *J*, whereupon a continuous curtain wall is provided. Means may be provided if desired for utilizing the columns *J* as part of the foundations, and for this purpose the ends of the I-beams *C* may be extended so as to take a bearing through suitable wedges or distributing beams if desired on the top of columns *J*. The columns *J* may be connected in other suitable manner to the footing *D* if desired.

The foregoing illustrates only one manner of employing my invention, and this may be modified and other or equivalent devices employed within the limits of the appended claims, without departing from my said invention.

An instance of a desirable modification which may be employed without change in the essential characteristics of my invention resides in the footing *D*. In the drawing the said footing is illustrated as surrounding the original footings *e* and as extended on both sides thereof. It is desirable that the extended footing should have close contact with the original footing so as to properly support the same, but it may be found objectionable to extend this footing toward the interior of the building, and if desired the extension of such footing inside of the original footings may be omitted and the same may be extended toward the front. It is highly advantageous that the interior of the building should be undisturbed. It has happened on numerous occasions that the method employed of providing a building with a new foundation, has required that the basement should be opened and exposed to the elements for periods as long as 12 months at a time, whereby great injury is done to the interior of the building by the action of frost upon the water pipes etc. According to my invention all interference with the building is avoided, and this I regard as one of the important features of the invention. It is for this reason the extension of the said footing *D* inwardly may be dispensed with.

I claim as my invention:—

1. The method of underpinning a building or other structure which consists in locating supporting beams in supporting position relative to the original footings of said structure, in then constructing an extended unitary footing of concrete or the like having alternate recesses and projections in an outer edge and connecting the said footing to the structure to be supported by embedding a part of each of said supporting beams therein, in then locating columns in the earth in said recesses, and forming a pressure-re-

sisting connection between said new footing and said columns.

2. The method of underpinning a building or other structure which consists in locating supporting beams in supporting position relative to the original footings of said structure, in then constructing an extended footing having alternate recesses and projections in an outer edge and connecting the said footing to the structure to be supported by embedding a part of each of said supporting beams therein, in then locating columns in the earth in said recesses, and forming a pressure-resisting connection between said new footing and said columns, and in then locating columns between said first located columns thereby forming a curtain wall under said structure.

3. The method of underpinning a building or other structure supported on piers, which consists in locating I beams or the like supporting members in supporting position relative to the base portion of each pier, in embedding the base portions of said piers and said supporting members in a mass of concrete or the like forming a unitary footing for all said piers, and having alternate recesses and projections in an outer edge, in then locating columns in the earth in said recesses and interposing a pressure-resisting connection between said structure and said columns.

4. The method of underpinning a building or other structure supported on piers, which consists in locating I-beams or the like in supporting position relative to the base portion of each pier, in embedding the base portions of said piers and said I-beams in a mass of concrete or the like, forming a unitary footing, and in forming an edge of said footing with alternate recesses and projections, in then locating columns in the earth in said recesses and forming a pressure-re-

sisting connection between said footing and said columns.

5. The method of underpinning a building or other structure supported on piers, which consists in locating I beams or the like supporting members in supporting position relative to the base portion of each pier, in embedding the base portions of said piers and said supporting members in a mass of concrete or the like forming an extended and unitary footing, having alternate recesses and projections in an edge thereof, in then locating a column in the earth below each of said recesses and forming a pressure-resisting connection between the same and said extended footing, and in then locating columns between said first located columns thus forming a curtain wall.

6. The method of underpinning a building or other structure supported on piers, which consists in locating I-beams in supporting position relative to the base portion of each pier, in embedding the base portions of said piers and said I-beams in a mass of concrete or the like forming an extended and unitary footing, having alternate recesses and projections in an edge thereof, in then excavating pits in said recesses and forming columns in said pits of concrete or the like, and placing beams between the upper part of said columns and said I-beams in said extended footings so as to transfer a load to said columns, and in then excavating pits between said concrete columns and filling them with concrete or the like forming a curtain wall.

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

JOHN B. GOLDSBOROUGH.

Witnesses:

MARTIN B. MEAGHER,
ALPHONSE J. JASB.

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