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J. B. GOLDSBOROUGH.
METHOD OF EXTENDING FOUNDATIONS.
APPLICATION FILED AUG. 26, 1912.

1,060,077.

Patented Apr. 29, 1913.

Fig. 1.

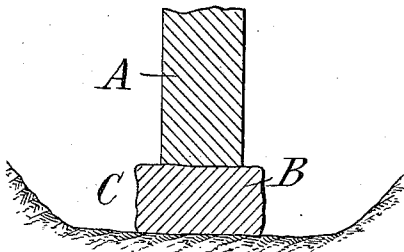


Fig. 2.

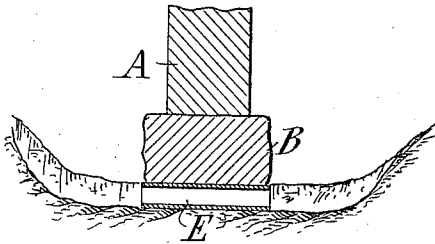


Fig. 3.

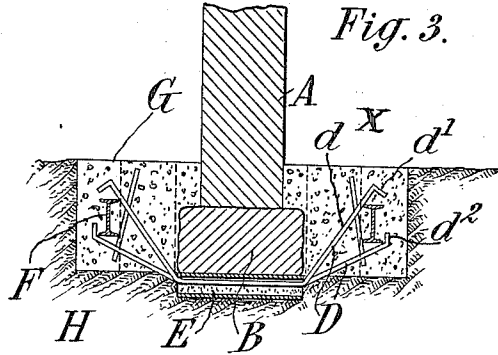


Fig. 4.

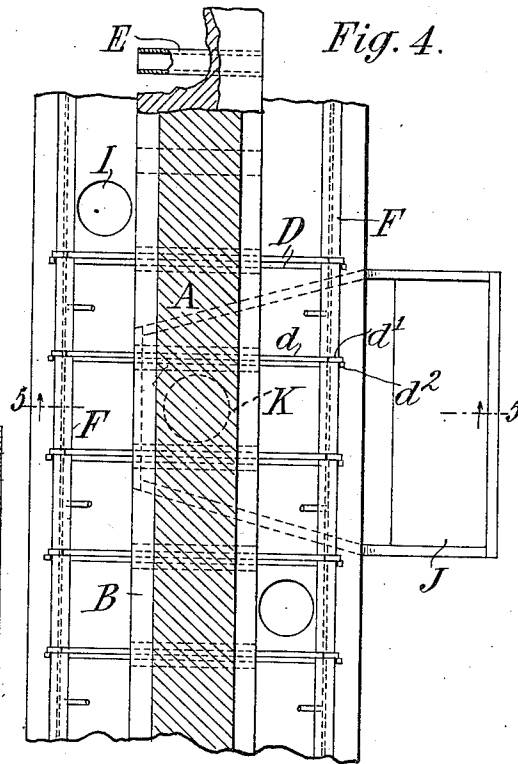
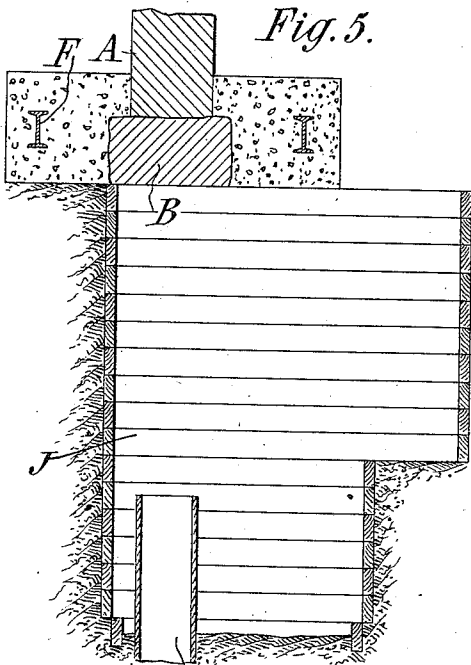


Fig. 5.



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UNITED STATES PATENT OFFICE.

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METHOD OF EXTENDING FOUNDATIONS.

1,060,077.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Application filed August 26, 1912. Serial No. 717,156.

To all whom it may concern:

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

My invention relates to a method of extending the foundations of a building or other structure, and has for its object to provide means whereby the area of the foundation may be increased and the extended footing connected to the original footing, or to the wall of the building so that it shall bear a proper part of the load to be supported.

Another object of my invention is to provide means whereby additional extended supports may be provided for such building or other structure without undermining the original footings.

It frequently becomes necessary by reason of a decrease in the bearing power of the earth, due, for instance, to adjacent operations, or by reason of an increase in the load to be carried upon the footings, that the supporting power of these footings should be increased. The usual and customary manner of accomplishing this object has been by removing the original footings, either in sections or totally, and by providing temporary supports for the said building to take the place of the supports thus removed. Thereupon a new footing was constructed of the requisite increased size, and suitably connected to the superior portion of the wall. This operation involves a shifting of the weight of the building from the original supports to the temporary support, which is an extremely hazardous and difficult operation.

An important object of my invention is the provision of means whereby the original footing may be increased as stated without the necessity for employing such temporary supports.

According to my invention, I locate suitable supporting members in such position relative to the base portion of the wall as that they shall serve to receive the weight thereof, and then upon one or both sides of the wall at a convenient level, I construct new and extended footings of the desired size, and in such footings, which are preferably formed of concrete, the ends of the sup-

porting members are embedded and anchored so that the said new footings will have the load properly transferred to it.

In the accompanying drawings I have illustrated a desirable manner of employing my said invention.

Here Figure 1 illustrates a portion of a building wall, the footings of which it is desired to extend and about the footings of which the earth has been excavated to form a trench. Fig. 2 illustrates the employment of a pipe through which supporting members are to be passed. Fig. 3 illustrates in vertical section my improved extended footing complete. Fig. 4 illustrates such extended footing in plan view partly in section, and illustrating also the employment of means for underpinning such footing. Fig. 5 is a section on the line 5—5, Fig. 4.

The wall A may be the wall of any building or other structure which it is desired to provide with an extended footing or new footing of increased area. The wall is illustrated as supported upon the usual footing B. On both sides of this footing if the new footing is to be extended on both sides, I excavate a trench C. If the new footing is only to be extended from one side of the wall, said trench may be constructed at one side of the wall. I then locate in position transversely of the wall and at the base portion thereof supporting members D. These will, in case the footing is to be extended on both sides, extend from one side of the wall to the other and will project beyond the wall where the said supporting members are preferably deflected or bent, as at d , so that they shall rest in the bed of concrete which is to be formed. The supporting members D are not necessarily of any particular construction. They may be of wire rope, or of bars, or of rods, and may well be constructed, as illustrated, of rods in the form of stirrups having their ends bent upward, as at d , and having upon the extremity hooks $d^1 d^2$. I have illustrated the said rods as located vertically beneath the old footing B, which is a very desirable position, providing the said footing is to remain, and is of suitable construction. If the old footing or any portion of the wall is to be removed, the said supporting members may be located at that part of the base portion of the wall which is to remain. I have illustrated the said rods as passing through a stirrup supporting member E in the form

of a pipe section, and this construction will preferably be used by me. The trench C having been excavated to the depth indicated in Fig. 1, small transverse trenches large enough to receive a pipe section E, may then be excavated transversely of the wall at desired intervals, and in each of these sections a pipe E may be placed. The employment of this pipe presents several advantages, (1) in that it serves in a measure to distribute the strain between the supporting members and the old footing, (2) in that it prevents the edge of the old footing B from becoming fractured, and (3), the most important, in that it provides means whereby grout may be forced in and about the supporting members or the stirrups D for the purpose of preserving the same, and in all places producing a uniform bearing between the pipe and said stirrups.

When the stirrups D have been suitably located in position, preferably in the pipe E, longitudinal I beams F are preferably located at a point which will be near the outer edge of the extended footings and parallel with the walls. These I beams serve two functions. First, they serve to reinforce and strengthen the new extended footing, and secondly, they serve as distributing beams by which through the stirrups the load will be distributed uniformly throughout the extended footings. The stirrups and I beams having thus been located in position, a mass of concrete G is applied at one or both sides of the wall A so that the trench C is substantially filled and the concrete preferably extends a suitable distance above the original footing B and lies in a solid mass from the wall A to the outer edge of the said extended footing. When the said concrete G has set, the load upon the wall A may safely be increased and the new extended footing, which as a whole I shall designate H, will form practically an integral part of the wall and will constitute a permanent foundation of great strength and may be of any desired area sufficient to support the load which it is expected to carry. The stirrups D will be firmly held in the concrete G and will effectually serve to transfer the weight of the wall through the original footing B to the extended footing H. Reinforcing rods, as X, may be employed if desired. If it is desired the said wall may be underpinned, and for this purpose openings I may be formed in the said extended footing H during the process of construction through which piles may be driven and suitably connected to the wall. The method of underpinning by the formation of openings in the said footing and the driving of the piles therein and subsequent connection to the wall, is not herein claimed but is claimed in a separate application filed by me August 26, 1912,

Serial No. 717,155. If desired pits J may be sheeted down beneath the said wall and the extended footing H, and this may safely be accomplished by reason of the greatly increased support afforded the said wall by the extended footing. In these pits, if desired, sectional columns K may be driven to a firm substrata by means of hydraulic or other jacks reacting against any suitable part of the footing H, and when driven the said columns may be cleaned out and filled with concrete in the usual manner and suitably connected to the overhead wall so as to bear the load thereof. In such case the pits J may if desired be filled with concrete.

It will be perceived that by the foregoing method I am enabled to underpin a building or other structure without the employment of any needles, braces, shores or other temporary supports whatever, and without the removal of the soil supporting such structure, thereby overcoming the many disadvantages usually incident to the employment of such temporary supports, and to the removal of such soil. It is usually the case where a structure requires underpinning, that access must be had beneath the original footing of such structure. This requires the removal of a considerable quantity of the soil underlying such footing, thereby weakening the support of such structure and occasionally causing settling. When such removal is of a considerable extent, or when the entire original foundations have been removed as is frequently the case, temporary supports for the structure must be provided. These are usually needles which are arranged transversely of the structure and are supported on cribs. Shores and braces etc. are also employed. Such temporary supports obstruct the execution of the work in hand and materially interfere with the use and occupancy of the erected structure. It frequently happens that the new foundation is not provided until the work in hand is completed. This requires that such temporary supports should be maintained sometimes for several months, and I have known them to be employed for a year. During this time owing to the impaired sustaining power of the earth the temporary supports must be carefully watched and frequently adjusted to prevent settlement and a dangerous accident. In such cases, too, the lower floors of the structure are frequently open and exposed to the elements, which is a great disadvantage. These, and many other objections to prevailing modes of underpinning, are overcome by my method whereby a new foundation is provided, practically without removal of the soil under the original footings, in a short time, with a minimum amount of interference with the interior of

the old structure or of the work in hand, and which may be easily installed before the adjacent excavation has proceeded deep enough to impair the stability of the old foundations.

While I have illustrated a desirable mode of employing my said invention, I do not necessarily regard my invention as limited to the particular sequence of operations or instrumentalities employed. As has been before stated, the extended footing may be constructed at one side only of the wall and it need not necessarily be at the extreme lower part of the wall. These and other modifications or equivalent steps which will suggest themselves to the engineer practising my invention may be made within the limits of the appended claims.

What we claim is:—

1. The method of extending the foundations of a building or other structure, which consists in locating stirrup receiving members having longitudinal channels at desired intervals transversely of the base portion of a wall of the building, said members having a length substantially equal to the width of the footing and adapted to protect the same, in inserting stirrups therein, in constructing lateral extensions from said wall of concrete or the like, and embedding the ends of the stirrups in such extensions.

2. The method of extending the foundations of a building or other structure, which consists in excavating a trench to substantially the base of the original footings, in locating hollow stirrup receiving members at desired intervals transversely beneath the original footing, in inserting stirrups therein and filling said hollow members with grout or the like, in constructing lateral extensions from said wall of concrete or the like, and embedding the ends of the stirrups in such extensions.

3. The method of extending the foundations of a building or other structure, which consists in excavating a trench to substantially the base of the original footings, in locating hollow stirrup receiving members at desired intervals transversely beneath the original footing, in inserting stirrups therein and bending the end of said stirrups, in filling such hollow members with grout or the like, and in constructing lateral extensions from said wall of concrete or the like and embedding the ends of the stirrups in such extensions.

4. The method of extending the foundations of a building or other structure, which consists in excavating a trench to substantially the base of the original footings, in locating hollow stirrup receiving members of a length substantially equal to the width of the footing at desired intervals transversely beneath the original footing, in inserting stirrups therein and bending the end

of said stirrups, in locating reinforcing beams longitudinally of said wall and in position to distribute the load from said stirrups upon said extended footing, in constructing lateral extensions from said wall of concrete or the like, and embedding the ends of the stirrups and the beams in such extensions.

5. The method of extending the footings of a building or other structure, which consists in excavating to substantially the level of the base of said footings, in locating stirrups transversely of the base portion of said footings, in locating beams parallel with said wall and beneath the ends of said stirrups and above said footings, in constructing lateral extensions from said wall of concrete or the like extending above said footings, and embedding the ends of the stirrups and said beams in said concrete, whereby said beams reinforce said concrete and distribute the load from said stirrups upon said extended footings.

6. The method of extending the footings of a building or other structure, which consists in excavating a trench to substantially the base of the original footings, in locating pipes at intervals transversely beneath said footings of a length substantially equal to the width of said footings, in inserting stirrups in said pipes having projecting ends, in locating beams in position to receive and distribute the load from said stirrups, and in forming extended footings of concrete or the like and embedding the ends of said stirrups and said beams therein.

7. The method of extending the footings of a building or other structure, which consists in excavating a trench to substantially the base of the original footings, in locating pipes at intervals transversely beneath said footings, in inserting stirrups in said pipes having projecting ends, in locating beams in position to receive and distribute the load from said stirrups, in filling said pipes with grout or the like, and in forming extended footings of concrete or the like and embedding the ends of said stirrups and said beams therein.

8. A foundation for buildings or other structures, comprising stirrups located beneath the wall of said building and having ends projecting beyond said wall and bent upwardly, footings formed of concrete or the like extended laterally on each side of said wall and having their bases at substantially the level of the footing of said wall in which the ends of said stirrups are anchored.

9. A foundation for buildings or other structures, comprising pipes arranged transversely at intervals beneath said wall, stirrups in said pipes and embedded in grout or the like therein and having their ends projecting therefrom, and footings formed

of concrete or the like extended laterally on each side of said wall in which the ends of said stirrups are anchored.

10. A foundation for buildings or other
5 structures, comprising stirrups located beneath the wall of said building, footings formed of concrete or the like extended laterally on each side of said wall in which the ends of said stirrups are anchored, and
10 beams located parallel with the wall and embedded in said extended footings, and rein-

forcing same and arranged to receive the load from said stirrups and distribute it throughout said extended footings.

In witness whereof, I have hereunto 15 signed my name in the presence of two subscribing witnesses.

JOHN B. GOLDSBOROUGH.

Witnesses:

MARTIN B. MEAGHER,
ALPHONSE J. JAROT.

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