March 1, 1932. T. McCAULEY, JR., ET AL 1,847,842

DEVICE FOR USE IN CONSTRUCTING UNDERGROUND WALL STRUCTURES AND BUILDING SUPPORTS AND METHOD OF USING SAID DEVICES

Filed Nov. 29, 1929 2 Sheets-Sheet 1

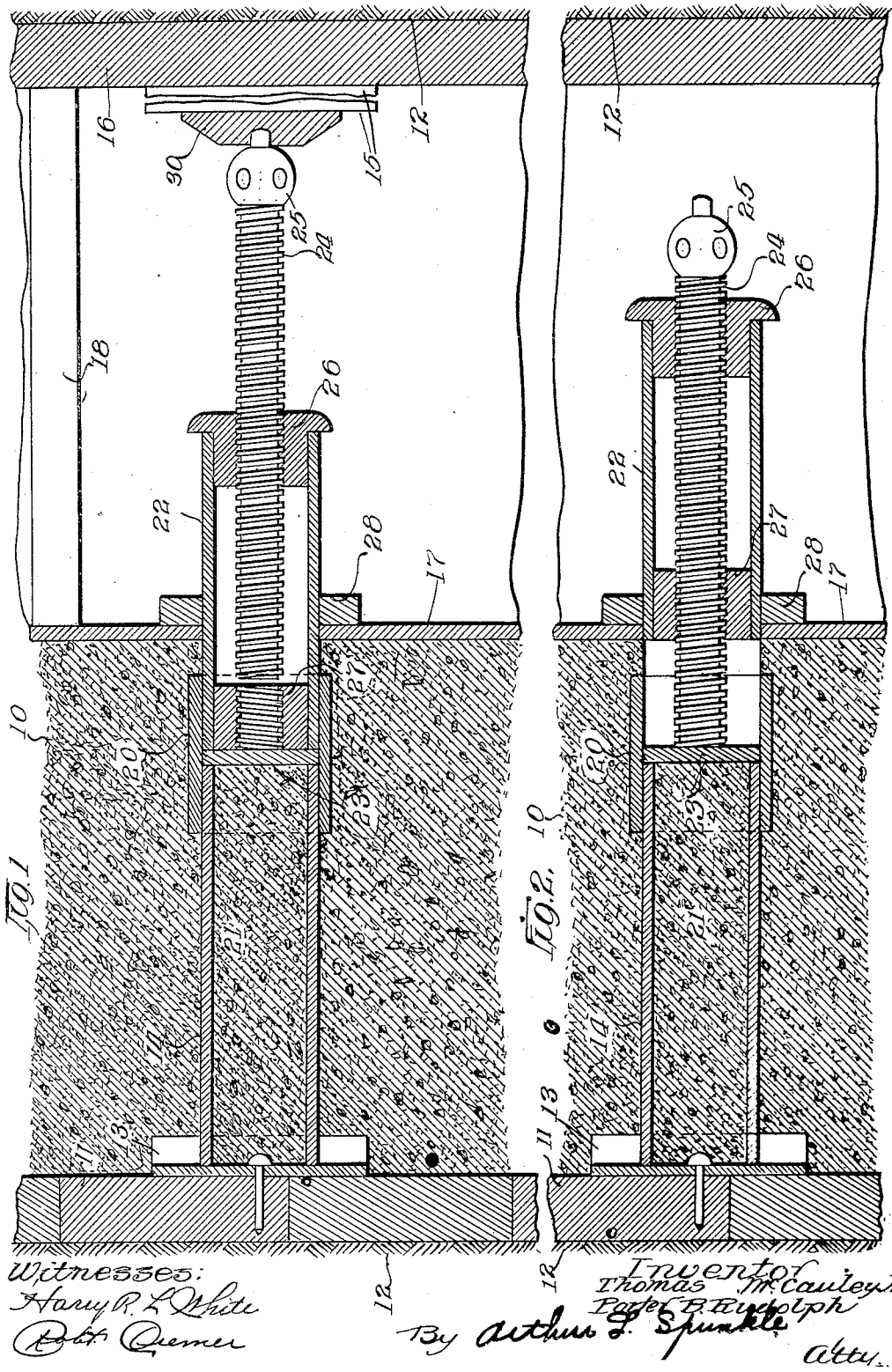


Fig. 1.

Fig. 2.

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Fig. 3.

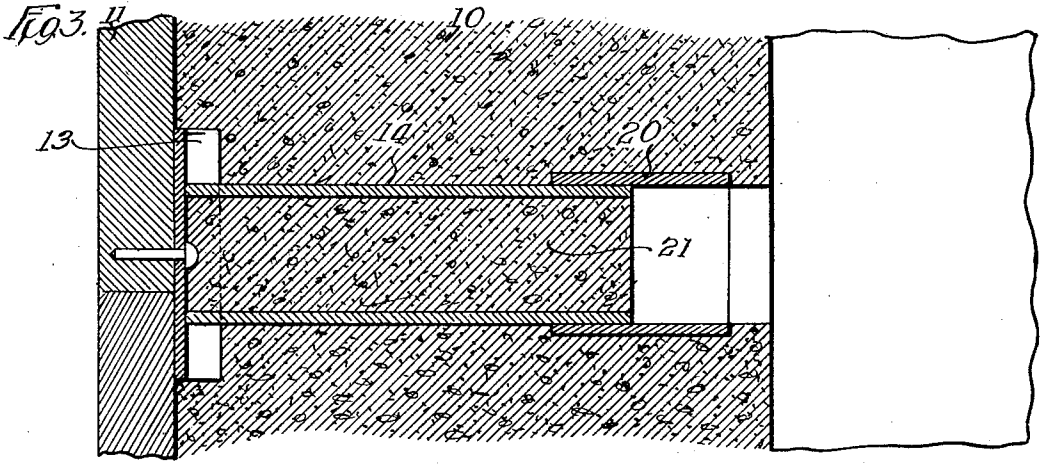


Fig. 4.

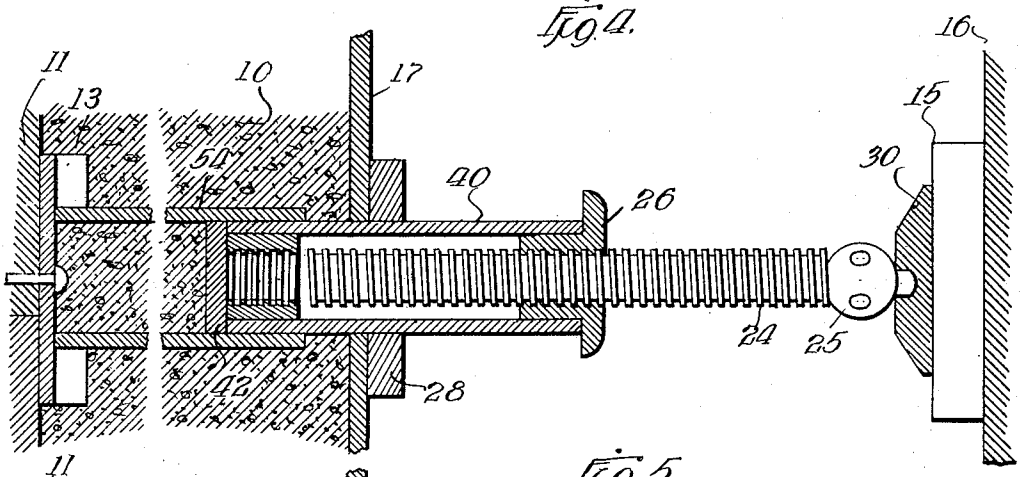
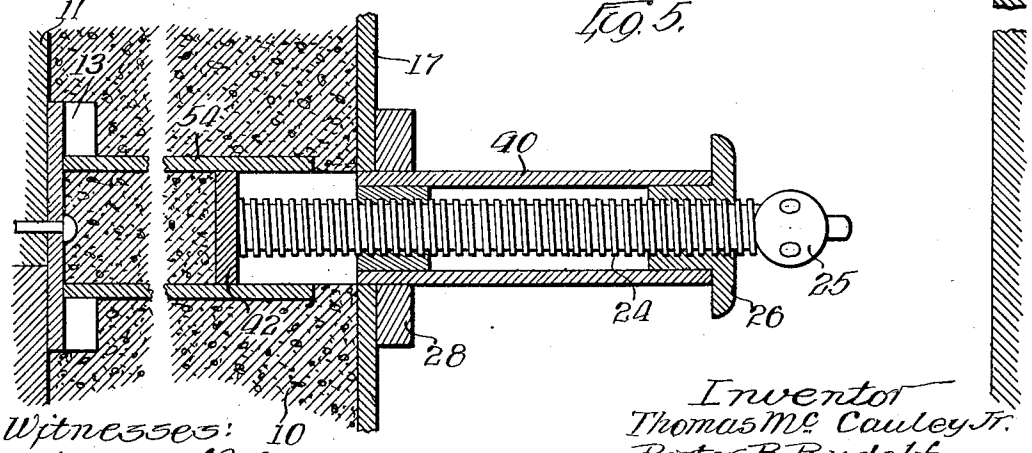


Fig. 5.



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UNITED STATES PATENT OFFICE

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DEVICE FOR USE IN CONSTRUCTING UNDERGROUND WALL STRUCTURES AND BUILDING SUPPORTS AND METHOD OF USING SAID DEVICE

Application filed November 29, 1929. Serial No. 410,318.

The invention relates to devices and a method of using the same in the construction of underground walls of concrete or analogous building material, such walls being commonly referred to as basement or sub-basement walls.

It is well known that in the construction of basement and sub-basement walls in modern practice frequently going several stories underneath the surface of the ground, difficult problems are presented in soft or sandy conditions of earth and before the material necessary for the building of such underground walls may be put into position, the trenches that are excavated must be sheathed or lined and the sheathing or lining must be substantially braced and the walls of loose wet earth or sand must continue to be braced especially when very deep or when unusual pressures develop, due to the weight of adjacent building structures and the like, until after the concrete for the wall has been poured and set. For bracing the sheathing of trenches in which concrete walls of basements or sub-basements are being built adjustable jack screws have heretofore been used. Such jack screws have sometimes consisted of wood blocks or drums six or eight inches in diameter and in length less than the width of the trench. Co-operating with such members are metallic screws engaging threaded metal blocks so that by rotation of the screw the effective length of such jack may be increased and the desired pressure between the sheathing walls of the trench may be maintained both during the digging of the trench and during the introduction of the concrete for forming the walls. With the use of the wood bodied jacks, obviously, since the jacks, if not removed, would extend through the ultimate finished wall and result in an imperfect wall, the concrete must be introduced first at the bottom of the trench in sections and each section allowed to harden before the jack screws immediately above the top of the section are removed. A concrete wall thus formed results in undesirable and possibly leaky seams.

In order to brace the trench sheathing it has heretofore been proposed to use jack screws made of hollow metallic pipe filled with concrete or other suitable filling material for a part of their length, the filled part of such a jack body being normally less than the ultimate thickness of the wall of the basement or sub-basement. The body or drum of the jack has been made longer than the normal thickness of the wall so that as the concrete of the wall is poured the metal will project on the open side of the wall for some distance, requiring an expensive operation of cutting off the projecting end of the pipe, usually inside of the outer wall of the concrete by a suitable cutting device as an acetylene torch, after which the opening thus left in the concrete wall in to where the pipe is filled with concrete must be filled with concrete and the surface smoothed over. In a single building, as some of the large modern structures when there are several stories of basement and sub-basement walls, and especially in sandy underground conditions, several thousand of such jack screws must be used and the loss of the material wasted in cutting off the projecting jack screw pipe bodies together with the labor of such cutting and the refinishing of the exposed wall surfaces will amount to several thousand dollars.

Our invention is designed to minimize both the waste of material and the labor required in the removal of jack parts and the smoothing and refinishing of the basement wall surfaces.

It is a further object of the invention to provide a novel form of jack screw in which the body or drum portion thereof not including the screw is of two separable parts, one part of which carrying the screw is detachable from the other part of the jack so that the latter after the underground wall is formed and set may be incorporated as a part of the finished wall when the other and removable part of the jack body and screw are detached from the wall; and an important feature of the invention, making this operation possible and practicable resides in the novel construction of the two separable parts of the body portion of the jack by which it will be able to function in a normal manner

in co-operating with the screw to serve as an extensible brace and by reversal of the direction of the rotation of the screw, the removable portion or section of the jack body with the screw which it normally carries, may be forcibly ejected under screw pressure from the surrounding and contacting portions of the underground wall in which it is embedded for a portion of its length in order to enable the other and non-removable portion of the jack body or strut to be always completely embedded and encompassed within the body of the concrete wall and between the two faces thereof.

It is a further object of the invention to provide a novel form of jack screw in which the body portion thereof is of two separable parts, one part of which is detachable from the other parts of the jack so that it may be incorporated as a part of the finished wall when the other part of the jack body and the screw are detached from the wall, improved means being provided whereby the inner end of the screw may be caused to bear upon the detachable part of the jack body which is to be incorporated as a permanent part of the wall, for forcibly separating the detachable parts of the jack and making possible the removal of such detachable parts from any contact or engagement as such detachable parts of the jack may have with the concrete part of the wall.

Other objects of the invention will appear from the following description of the preferred embodiments of the invention, reference being had to the accompanying drawings forming a part of the specification, the novel features being set forth in the appended claims.

In the said drawings,

Fig. 1 is a transverse, vertical sectional view illustrating a typical basement or sub-basement trench with sheathing in position along the trench walls, the wall and one of the jack structures being shown in section with the jack structure in an extended or bracing position.

Fig. 2 is a view similar to Fig. 1 showing the screw of the jack operated in a manner to retract the detachable portion of the jack body so that it may be removed from the finished wall structure after the concrete has been poured and the wall has set.

Fig. 3 is a view similar to Fig. 2 showing the condition of the wall adjacent to the jack after the wall has set, and the detachable portion of the jack removed, leaving the wall in condition for finishing by the introduction of concrete or other plastic material.

Fig. 4 and Fig. 5 are views similar to Figs. 1 and 2 but illustrating a slightly modified form of jack structure.

The typical form of concrete wall is designated in Figs. 1 and 2 by the reference character 10. 11 represents suitable sheathing which is put in position along the ultimate wall side of the trench as the digging of the trench proceeds downwardly. Adjacent earth is indicated at 12. Metal channel bars 13 are spaced apart in vertical position at suitable intervals. These bars may be secured by nailing into the sheathing 11 as indicated, being spaced apart to take one end of the metallic tubes or cylinders 14 of the jack screws 14 of the jack screws. The earth in section at the opposite side of the trench is also designated by reference character 12 and on that side the trench wall is lined by sheathing extending vertically. Longitudinal bars of wood, usually several feet in length called walers are applied to hold the vertical sheathing members in position. 15 designates the waler and 16 the vertical sheathing members.

After the trench is completed and sheathed a wood spacing wall designated at 17 will be erected to define one of the ultimate surfaces of the basement or sub-basement wall 10. The temporary wall 17 will be supported by suitable braces 18. With the requisite number of spacing jacks in position the concrete 10 may be poured in the wall form between the members 11 and 17 and allowed to harden and set in the manner illustrated in Fig. 1.

The construction and mode of operation of the jack screw device will now be described.

The length of the tubular portion 14 of the jack body which is of iron or steel tubing will depend somewhat upon the thickness of the wall under construction. Such walls ordinarily run from twenty-four to forty-eight inches or more in thickness. In any event, we would prefer to make the portion of the jack to be incorporated in the finished wall about four or five inches less in length than the thickness of the wall in which it is to be used. This relation of the length of the portion of the jack body to remain as a permanent part of the wall is important in order that the end thereof adjacent the inner face of the wall shall always be within the face of the wall since in practice it is found to be impossible to make up pre-determined lengths of such struts or wall portions of the jack bodies with any assurance that they will terminate precisely at the finished, exposed face of the wall, the reason being that the sheathing at the sides of the trench and the beams or walers contacting therewith are liable to variations of anywhere from one to three inches in general practice due to various formations of soil or underlying earth strata and the inner face of the wall will obviously be constructed to conform to an established line co-inciding with the desired vertical finished surface of the wall. Therefore, all attempts heretofore to use embedded struts as detachable parts of jack bodies have proved impractical because of difficulty and expense in attempting to de-

tach the removable portions of the jack body after the wall is formed where the concrete surrounds any portion of the same, or in the event of protruding portions of such struts, both of which conditions may obtain in a single structure, any protruding portions must be cut away by the use of acetylene torches or similar means at considerable expense. This part 14 is preferably cylindrical metal tubing about five or six inches in diameter and has preferably brazed or electrically welded upon one end thereof the telescoping piece of tubing 20. The tubular part 14 of the jack may be filled with concrete, as indicated at 21. In practice, we prefer to make up a large supply of the tubular members 14 with telescoping parts 20 attached and where it is desired they be filled with concrete, this, obviously, may be done at any time so as to have these parts ready for the building operation. The jack is further made up of the tubular member 22, preferably of the same material as the part 14. 23 is a substantial metallic disc that may be inserted in the enlarged open end of the member 14 to provide a seat for the engagement of the screw of the jack for a purpose to be hereinafter described. 24 is the usual threaded screw provided with a spherical head 25 with one or more diametrical openings adapted to take a suitable bar or tool for rotating the screw. Screw 24 is threaded into a flanged cap 26 on the outer end of the tubular section 22 and 27 is a threaded block electrically welded or otherwise secured to the inner end of the tube 22.

When the trench is being prepared it will be obvious that the sheathing of the walls thereof will be braced by the complete jack screws assembled as described and as shown in Fig. 1. When the form wall 17 for the inner wall of the basement wall structure is being prepared the form member 17 will be obviously cut to surround the jack body, and for strengthening purposes suitable wood collars 28 may be used to surround the jack body. It will be obvious that with the parts of the jack shown in Fig. 1 the opposite sheathing walls of the trench may be adjusted as desired at any time prior to the setting of the wall and removal of the jack.

When a sub-structure like the wall 10 has been built and has set, it will be obvious that workmen will have access to the trench between the removable form wall 17 and the sheathing 16. It will also be apparent that in this structure the sheathing 11 will remain in position attached to the wall with the earth pressing close against the same. But on the other side of the wall 10 after the wall has hardened and set the form wall 17 and the removable parts of the jacks may be removed, beginning at the bottom of the trench. Obviously, the longitudinal braces 18 will be removed as the finishing of the wall from the bottom upwardly and the successive removal of the jack screw parts progresses. The walers 15 may be reinforced by metallic blocks 30 engaging the spherical portions 25 of the screws for strengthening purposes. With a jack constructed as shown, it will be obvious that pressure will be exerted upon the threaded cap 26 and thence upon the plate 23 to the tube 14, making the jack body a substantially rigid structure.

In Fig. 2 is shown the adjustment of the jack screw for removal purposes after the wall is poured and has set. As the screw is rotated inwardly the inner end engages the block 27, releasing the head 25 from the waler 15. Further turning of the screw in the same direction causes the inner end to engage the threaded fixed block 27. As the screw is further rotated the inner end thereof engages the concrete 21 or the metal plate 23, when the latter is used. The block 27 being securely welded to the tube 22, enough pressure may be applied to easily force the block 27 and the tube 22 attached thereto entirely out of the concrete wall as illustrated in Fig. 2. As soon as the screw and the tube are in position, as shown in Fig. 2, they may be readily lifted from the wall and these parts will be available for further work of the same kind. As soon as these removable parts 22, 24, 26 and 27 of the jack screws are removed with the braces 18, obviously, the form wall 17 may be removed from the concrete wall and the holes thus left in the wall surface by the removal of the tubes 22, as indicated in Fig. 3, may be filled and resurfaced without any further mechanical work than the filling and surfacing of these depressions, thus affecting considerable economies in the saving of both labor and material.

In Figs. 4 and 5 a tube 54 like the tube 14 is shown but without the attached telescoping section 20. This tube will be relatively longer, and a tube of smaller diameter, as indicated at 40, will be employed to support the screw 24 and the cap 26. In this form a metal disc 42 may be employed, if desired, to reinforce the concrete both as to the compression strains between the tubes as well as the compression strain of the end of the screw in the detaching operation after the wall has been poured and set. Aside from the structural differences noted, the devices, Figs. 4 and 5, are similar to the embodiment shown in Figs. 1 and 2, and their mode of operation is substantially the same.

What we claim as our invention and desire to secure by Letters Patent is:

1. A jack screw structure comprising a metallic tubular body device made of two tubular portions adapted to have telescopic relation, one of said portions being provided with a seat for the telescoping end of the other portion, a perforated and screw threaded block fixedly secured to one of the tubular body

portions, and a screw positioned in said screw threaded block and being provided with an adjusting head on the outer end thereof and being adapted to engage at its other end a fixed part of the co-operating tubular member whereby upon reverse rotation of the screw member said two tubular portions will be forcibly separated.

2. A jack structure for use in constructing basement or sub-basement walls and the like, consisting of an operating screw and two separate detachable body portions, one of which is composed of iron or steel tubing and in length appreciably less than the thickness of the wall to be formed, said tubular portion being filled substantially throughout its length with concrete except for a short distance at one end thereof whereby to form an opening for telescopic engagement with the other tubular portion of the jack body, means for operatively securing the screw member of the jack to the last said body portion of the jack body, and means for causing the said screw member when operated to its extreme inward position to exert a pressure to separate the multiple portions of the jack body and to forcibly free the tubular portion carrying the screw from the other concrete filled tubular portion of the jack body and from any contacting portions of concrete in the wall.

3. A jack screw structure designed for use in constructing basement and sub-basement walls and the like, comprising a rotatable screw member, threaded substantially throughout its length, and a jack body comprising two telescopically connected separable tubular members of iron or steel, one of which is filled with concrete, and means on the other tubular member for permitting a crowding action between the telescoping tubular portions of the jack body to forcibly separate by pressure of said screw that part of the jack body and the screw from the concrete filled portion thereof and from any contacting portions of a concrete wall built around the said body portions of the jack body.

4. A jack screw structure for use in building underground concrete walls and the like, comprising two telescoping tubular members of iron or steel forming the jack body, one of said members being filled for the greater part of its length with hardened and set concrete which is reinforced near one end of the tube with suitable means to receive the impact of one end of the screw member of the jack, threaded means for suitably supporting the screw member of the jack in the other of the telescoping members, and a screw threaded block adjacent the telescoping end of the tubular member of the jack body which carries the screw and which block is rigidly secured to the said tubular member whereby the screw member may be first brought into threaded engagement with the rigid block and by further rotation may cause the end thereof to exert a crowding action upon the reinforced concrete filling of the other tubular portion of the jack body to forcibly separate the tubular member carrying the screw from the concrete filled portion of the jack body and from any contacting portions of concrete in a concrete wall formed around said jack body portions.

5. A jack structure for use in constructing concrete basement or sub-basement walls and the like, consisting of two separate detachable parts, one of which consists of iron or steel tubing of a length less than the thickness of the wall to be formed, one end thereof being adapted to lie substantially flush with one face of the concrete wall when embedded in the wall, the other end thereof being adapted to be surrounded by the concrete of the wall and to lie within the body of the wall and spaced inwardly from the adjacent outer face of the wall, a rotatable screw member and means for supporting the rotatable screw member in relation to the end of the said tubular member which is spaced inwardly from an outer face of the wall, comprising a tubular supporting member carrying an extension adapted to telescopically co-operate with the embedded end of the first said tubular member which is inwardly spaced from the outer face of the concrete wall whereby stresses exerted by the said screw may be transmitted through the said detachable screw supporting device upon the embedded extremities of the said tubular member and whereby, after the concrete wall is formed and set, the said screw member and its said supporting device may be removed by the reverse rotation of the screw member from its telescopic engaging relation with the end of the tubular member and the contacting portions of the concrete wall.

6. A jack structure for use in constructing concrete basement or sub-basement walls and the like, consisting of two separate detachable parts, one of which consists of a rigid elongated member of a length less than the thickness of the wall to be formed, one end thereof being adapted to lie substantially flush with one face of the concrete wall when embedded in said wall, the other end thereof adapted to be surrounded by the concrete of the wall and to lie wholly within the body of the wall being spaced inwardly from the adjacent outer face of the wall, a rotatable screw member, and means for co-operating with and supporting the rotatable screw member in relation to the end of the first said member of the jack body which is spaced inwardly from the outer face of the wall, comprising a tubular member adapted to telescopically co-operate with the embedded end of the first said part of the jack body which is inwardly spaced from the outer face of the concrete wall, the said tubular member being provided

with a threaded device at the outer end thereof for engagement with the screw for use in adjustably extending the effective length of the jack, and with a second threaded member fixed in relation to the tubular member adjacent the end thereof adapted to co-operate with the embedded end of the first said part of the jack whereby upon a retraction of the said screw by reversely rotating the same, the inner end thereof may be used to forcibly impinge upon the embedded portion of the jack body to forcibly separate the tubular portion from the embedded portion of the jack body and from the wall formed thereabout.

7. A jack screw structure for use in building underground concrete walls and the like, comprising a rotatable screw member, a head provided with internal threads for co-operating with the screw member in extending the effective length of the jack screw, a metallic tubular member engaging said head, an internally threaded block secured to the metallic tubular member, the said metallic tubular member being adapted to form one part of a two-part detachable jack body, the second part of which consists of a rigid member adapted to telescopically engage with the end of the metallic tubular portion of the jack opposite the end thereof carrying the aforesaid head, and means on the said second part of the jack body adapted to be engaged by the inwardly extended end of the screw when operated reversely to forcibly separate the telescoping portions of the jack body when the screw carrying portion of the jack body is embedded in a concrete wall.

8. The method of producing a wall in a trench which consists in sheathing the trench at the sides, setting walers transversely across the sheathing, placing between opposed walers screw jacks having multiple body portions arranged in telescopic abutting end to end relation, one of said body portions of the screw jacks being in length less than the width of the wall to be erected in the trench and the other of said body portions being formed of a thin walled pipe and provided with an internally threaded nut portion fixed in relation thereto to resist end thrusts upon the screw jacks, there being also a second internally threaded nut portion fixed in relation to the screw carrrying body portion of the jack to co-operate with the reverse rotations of the screw, erecting a wall form in the trench to co-operate with the sheathing at one side to afford a space for the wall to be formed, the said wall form being positioned so as to completely encompass the first said body portion of the screw jack and a part of the abutting body portion carrying the jack screw, pouring concrete into said space around the multiple body portions of the screw jacks within the wall space bounded by said sheathing and the said wall form, and subsequently, upon the setting of the concrete wall, forcing that body portion of the screw jacks from the concrete of the wall by reverse rotation imparted to the screw of the jacks thereby causing the screw to impinge upon a part fixed in relation to the body portion which is encompassed within the side edges of the wall.

9. The method of producing a wall in a trench which consists in sheathing the trench at the sides, setting walers transversely across the sheathing, placing between opposed walers screw jacks having multiple body portions arranged in telescopic abutting end to end relation, one of said body portions of the screw jacks being in length less than the width of the wall to be erected in the trench and the other of said body portions being formed of a thin walled pipe and provided with an internally threaded nut portion fixed in relation thereto to resist end thrusts upon the screw jacks, there being also a second internally threaded nut portion fixed in relation to the screw carrying body portion of the jack to co-operate with the reverse rotation of the screw, erecting a wall form in the trench to co-operate with the sheathing at one side to afford a space for the wall to be formed, the said wall form being positioned so as to completely encompass the first said body portion of the screw jack and a part of the abutting body portion carrying the jack screw, pouring concrete into said space around the multiple body portions of the screw jacks within the wall space bounded by said sheathing and the said wall form, subsequently, upon the setting of the concrete wall, forcing one body portion of the screw jacks from the concrete of the wall by reverse rotation imparted to the screw of the jacks thereby causing the screw to impinge upon a part fixed in relation to the body portion which is encompassed within the side edges of the wall, and finally, after the removal of the detachable portions of the screw jacks, removing a part or all of the wall form from the trench and finishing the exposed wall surface by the application of concrete to the cavities produced in the wall by the forcible removal by the screws of the detachable portions of the jacks as described.

10. The method of producing a wall in a trench which consists in sheathing the trench at the sides, setting walers transversely across the sheathing, placing between opposed walers screw jacks having multiple body portions arranged in telescopic end to end relation, one of said body portions of the screw jacks being in length less than the width of the wall to be erected in the trench and the other of said body portions being connected with an internally threaded portion carrying an adjusting screw, erecting a wall form in the trench to co-operate with the sheathing at one side to afford a space for the wall to be formed,

the said wall form to be positioned so as to completely encompass the first said body portions of the screw jacks and a part of the said abutting body portions carrying the screw, pouring concrete into said space around the multiple body portions of the screw jacks within the wall space bounded by said sheathing and the said wall form, and subsequently, upon the setting of the concrete wall, forcibly separating the body portions of the device carrying the screw by the forcible breaking of the bond thereof with the adjacent concrete and subsequently filling the resulting depression in the wall with plastic concrete to complete the finish of the wall surface and to embed the first said body portion of the screw jack beneath the finished surface of the wall.

11. The herein described method of constructing a wall which consists in digging the trench and supporting the sides thereof by means of suitable sheathing and multiple part extensible jacks, then making a form which will completely enclose one part of each of the multiple part jacks and a small portion of another part of the multiple jack body adapted to engagingly support the usual jack screw, then filling the form with concrete thereby embedding wholly within the wall one part of the said multiple part jack body and a part only of another portion of the multiple jack body, then forcibly removing the last said part of the jack body by forcibly breaking the bond between the same and the surrounding concrete of the wall, and finally filling the depression formed by the forcible removal of the last said part of the jack body from the wall with concrete to finish the wall surface and to completely embed the said enclosed part of the jack body as a permanent part of the wall structure.

12. The herein described method of constructing a wall in a trench which consists in supporting the sides of the trench by means of suitable sheathing and multiple part extensible jacks, then making a form which will completely enclose one part of each of the multiple part jacks, the last said part of the jack being in the form of an imperforate metallic tube capable of telescopically receiving a portion of another part of the multiple jack body adapted to engagingly support the usual jack screw, then filling the form with concrete thereby embedding wholly within the wall the said imperforate metallic tubular portion of the jack body which forms a housing for the said other portion of the multiple jack body carrying the screw and then after the concrete of the wall has set and formed, forcibly removing the screw carrying portion of the multiple jack body from the wall, and finally filling the depression, formed by the forcible removal of the last said part of the jack body from the wall, with concrete to finish the wall surface and to completely embed the said enclosed metallic tubular portion of the jack body as a permanent part of the wall structure.

In testimony whereof we have signed our names to this specification, on this 21st day of November A. D. 1929.

THOMAS McCAULEY, Jr.
PORTER B. RUDOLF.