

(No Model.)

3 Sheets—Sheet 1.

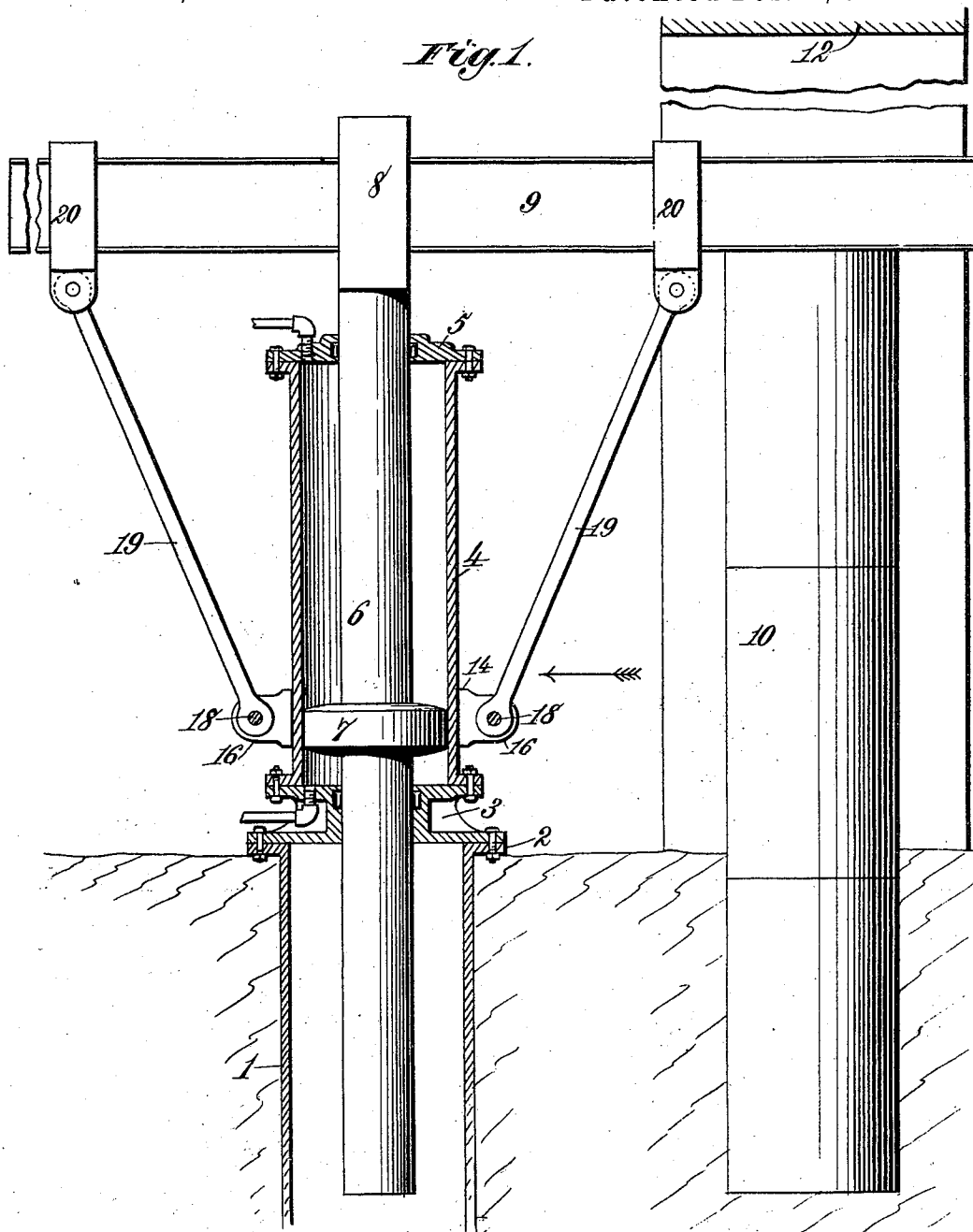
R. S. GILLESPIE.

MEANS FOR CONSTRUCTING SUPPORTS FOR BUILDING WALLS, &c.

No. 576,842.

Patented Feb. 9, 1897.

Fig. 1.



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(No Model.)

3 Sheets—Sheet 2.

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Fig. 2.

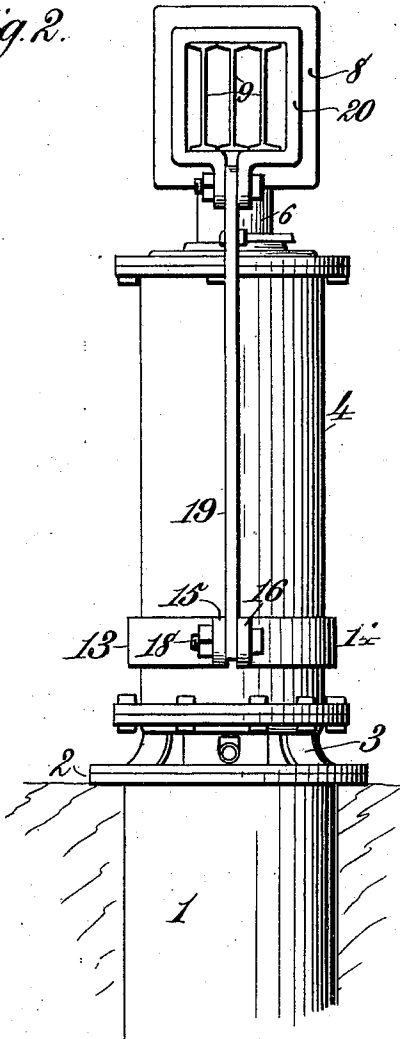


Fig. 3.

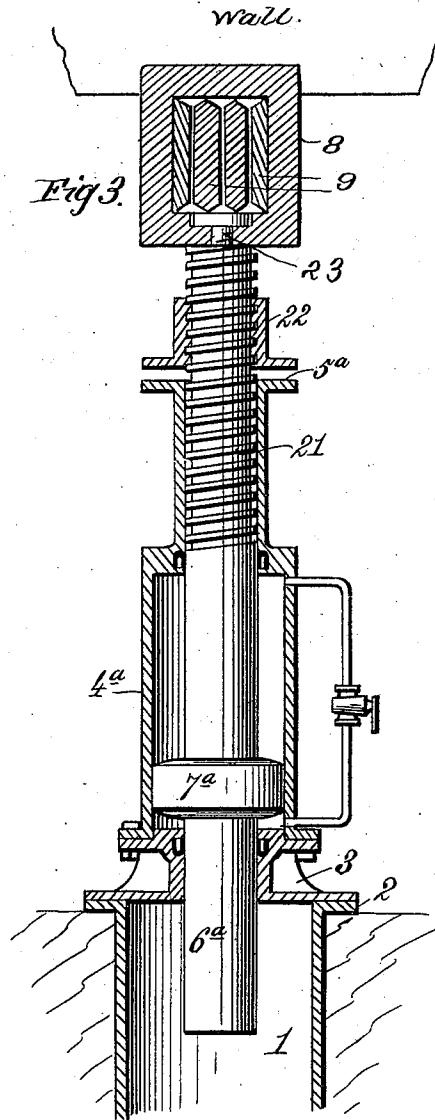
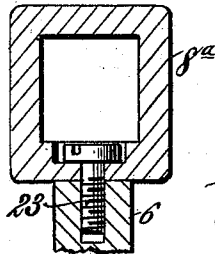


Fig. 4.



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Fig. 5.

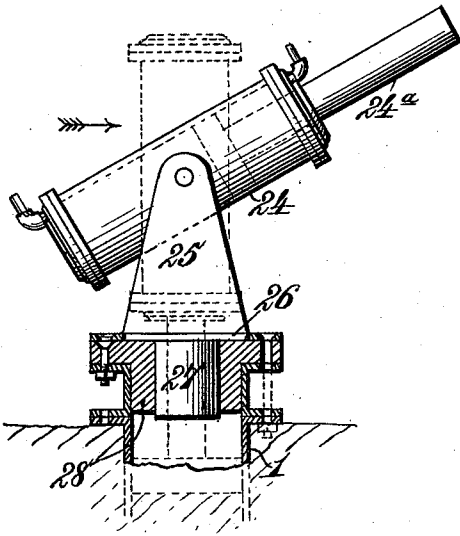


Fig. 6.

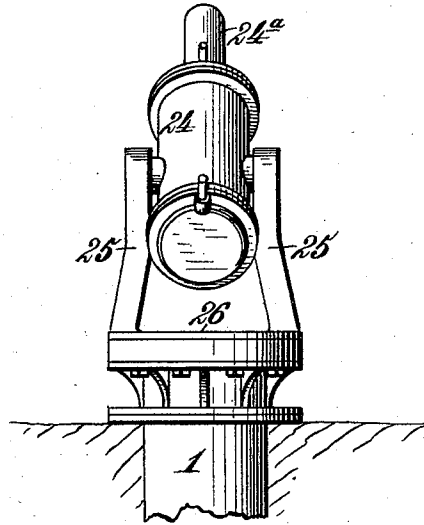
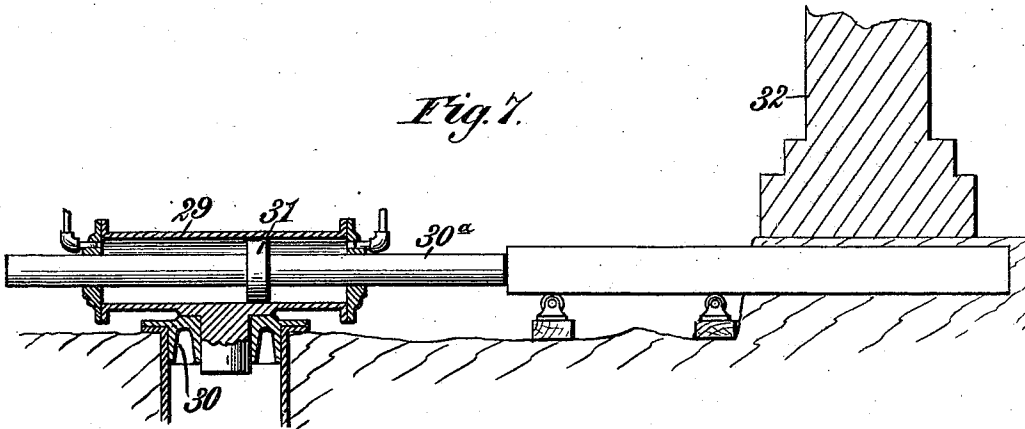


Fig. 7.



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UNITED STATES PATENT OFFICE.

RICHARD S. GILLESPIE, OF NEW YORK, N. Y.

MEANS FOR CONSTRUCTING SUPPORTS FOR BUILDING-WALLS, &c.

SPECIFICATION forming part of Letters Patent No. 576,842, dated February 9, 1897.

Application filed July 10, 1896. Serial No. 598,723. (No model.)

To all whom it may concern:

Be it known that I, RICHARD S. GILLESPIE, 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 Means for Constructing Supports for Building-Walls, &c., of which the following is a specification.

This invention relates generally to the construction of permanent or temporary supports for a building and particularly to the construction of foundations or supports for building-walls or other structures wherein hollow cylindrical columns of iron or other metal or material are driven or sunk into the earth in juxtaposition to the wall of an existing building for supporting the latter while excavating beside or below the original foundation for underpinning purposes, or for providing a base or foundation on which to erect the wall of a new building or other structure.

The invention has for its object to provide an improved fluid-operated apparatus for inserting or placing supports in proper position to sustain the wall of an existing building while excavations are being made or for the purpose of repairing the building or for providing a permanent or temporary foundation therefor.

The invention also has for its object to provide new and improved means for driving or sinking the columns at any required place or point, and to enable these columns to be driven or sunk directly under or at one side of the wall of an existing building by the use of a hydraulic apparatus without the necessity of depending on the superincumbent weight of the building-wall as a resistance to the hydraulic or power apparatus employed to drive or sink the columns.

The invention also has for its object to provide a new and improved hydraulic apparatus which is susceptible of practical use not only for driving or sinking wall and other supporting columns into the earth, but also for extracting or withdrawing such columns perpendicularly from the earth whenever desired.

These objects are accomplished in the manner and by the means hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation illustrating my improved fluid-actuated apparatus in operative position for driving or sinking a column perpendicularly into the earth directly under the wall of an existing building. Fig. 2 is a detail side elevation of the apparatus, looking in the direction of the arrow, Fig. 1. Fig. 3 is a sectional side elevation of a modified construction of the apparatus, showing the manner in which the latter may be used to support the superincumbent weight of a wall or other object. Fig. 4 is a detail sectional view of the head designed to be secured to one end of the ram. Fig. 5 is a detail side elevation showing another modification of my invention. Fig. 6 is an elevation of the same, looking in the direction of the arrow, Fig. 5; and Fig. 7 is a sectional elevation showing another modification of the improved apparatus, designed for driving or inserting needles horizontally under the wall of an existing building.

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 a pressure-resisting column, which is buried in the earth by driving or sinking the same until it reaches such depth as to secure the necessary friction and power of resistance to prevent it from being displaced or raised during the operation of the hydraulic ram hereinafter explained. This pressure-resisting column may be driven or sunk in any desired manner, but preferably it is inserted into the ground by the employment of the well-known water-jet ordinarily used to sink hollow or tubular structures into the earth. The column may, however, be driven or sunk by a hydraulic ram or any other apparatus or machine which will accomplish the purpose.

The pressure-resisting column is preferably in the form of a hollow cylinder, but it may be of any form or shape in cross-section suitable for the purpose. The column is designed to be made of sections or short lengths successively connected together during the time the column is being driven or sunk into the earth. The upper end of the buried column, which may project more or less above the surface of the earth, is constructed with a

flange 2, to which is bolted or otherwise securely fastened the base 3 of an upright or perpendicular ram-cylinder 4, having a head 5 attached to its upper end. The cylinder 5 contains a fluid-operated ram or plunger 6, having a disk or piston 7, which tightly fits the internal surface of the cylinder. The ram or plunger projects through the head 5 of the cylinder, and also through the base 3 thereof, so that the lower end of the ram or plunger can enter the pressure-resisting column, as represented in Fig. 1.

The upper end of the ram or plunger 6 is provided with a rigidly-attached head 8, which as shown is substantially square and is constructed with an approximately square opening for the passage of a horizontally-arranged beam 9, one or more. I prefer to employ several of the horizontally-arranged beams and to construct them substantially the same as ordinary iron I-beams, but obviously the cross-sectional shape of the beams can be changed to suit the conditions required, and a single beam may be used in the head 8 of the ram or plunger instead of several beams, as represented in the drawings. The beam 9, one or more, is engaged at or near the middle of its length with the ram-head 8 and is extended horizontally in opposite directions therefrom to any required extent, so that, if necessary, one end of the beam can be caused to enter a recess formed or provided in the lower portion of a building-wall and bear upon the upper end of a wall-supporting column 10, which is to be driven or sunk perpendicularly into the earth by the action of the ram or plunger, as will more fully hereinafter appear, whereby it is possible to drive or sink the column 10 directly under the wall 12 of an existing building.

The ram-cylinder 4 is surrounded on its exterior by a vertically-slidable collar, preferably made of two sections 13 and 14, having laterally or outwardly bent ears or lugs 15 and 16 for the passage of transverse bolts 18, which couple the collar-sections together and engage the lower ends of tie-rods or coupling-links 19. The upper ends of the tie-rods or links 19 are pivotally or otherwise suitably connected with two collars or heads 20, through which the horizontally-arranged beam, one or more, extends in such manner that if the ram or plunger be caused to descend by the application of fluid-pressure above the disk or piston 7 the beam 9 will be lowered or moved downward and the collar-sections 13 and 14 will slide on the ram-cylinder. If the end of the horizontally-arranged beam 9 is engaged with the upper end of the wall-supporting column 10, the latter will be caused to sink perpendicularly into the earth.

I have only illustrated a single pressure-resisting column 1 as a means for supporting and resisting the upward or downward pressure of the ram-cylinder, but if occasion demands the pressure-resisting column may be composed of a series of columns driven or

sunk into the earth in juxtaposition to each other, so that they can be surmounted by the hydraulic ram having its plunger constructed to engage and carry the horizontally-arranged beam or beams 9. As before stated, the pressure-resisting column, one or more, is driven or sunk perpendicularly into the earth a distance sufficient to enable it to successfully resist the tendency of the ram-cylinder to withdraw the column from the earth during the operation of the ram in driving or sinking a wall-supporting column 10.

The wall-supporting column 10 will in practice be made in sections successively driven into the earth in substantially the same manner as in Breuchaud's patent, No. 563,130, issued June 30, 1896. These columns are preferably made in the form of tubular cylinders, but they may be made of any required cross-sectional form or shape.

The cylindrical form of the ram-cylinder 4 enables the collar-sections 13 and 14 to turn horizontally thereupon, and since it is possible to axially rotate the ram or plunger 6 while the cylinder 4 remains stationary it will be evident that the horizontally-arranged beam or beams 9 can be turned or rotated horizontally in a circular path, so that it is possible to drive or sink supporting-columns, such as the column 10, at different or various points in a circle or circular path about or around the pressure-resisting column and ram.

In the practical operation of the improved hydraulic ram or fluid-actuated apparatus in driving a wall-supporting column the first section of this column is placed under and in alinement with one end of the horizontally-arranged beam or beams 9, as in Fig. 1, and the ram-plunger is caused to descend by admitting the working fluid into the ram-cylinder above the disk or piston which forms a part of the ram. After the first column-section has been driven or sunk the desired depth the motion of the ram or plunger is reversed, and another column-section is placed under the beam or beams 9 for a repetition of the operation. The column-sections can thus be successively connected and driven or sunk into the earth until they reach the required depth, which is usually bed-rock or a firm substratum. During the time that the ram is in operation the tie-rods or coupling-links 19 serve as braces to steady the movements of the horizontally-arranged beam or beams 9 and maintain the same substantially horizontal. The construction of the parts is such, as will be readily seen, that it is possible for the ram to exert powerful force in driving or sinking the column section by section without depending on the superincumbent weight of the building-wall or other structure to resist upward pressure of the ram-cylinder. In other words, the wall-supporting columns can be driven entirely independent of any connection with the wall of an existing building.

After the desired number of columns 10 has been driven or sunk perpendicularly into the

earth they may be employed for various purposes, but I particularly design them to constitute a subbase or subfoundation for the wall of an existing building, thereby rendering it possible to make deep excavations for the purpose of erecting a new building in juxtaposition to an old one. After the columns 10 have been driven or sunk by my improved apparatus a connection is made between the upper ends of the columns and the base portion of the wall of the existing building, which connection will ordinarily be a filling of brick or stone, but obviously may be of any material suitable for the purpose in hand, whereby the columns constitute a permanent subbase or subfoundation for the building-wall.

The improved apparatus enables hollow columns to be driven or sunk perpendicularly into the earth at any desired place or point without reference to the presence of a building-wall or other structure, and consequently it is feasible to drive or sink the columns without depending upon the superincumbent weight of an existing wall or structure, as an abutment, to resist the upward pressure of the ram-cylinder.

It is unnecessary for the lower end of the ram or plunger 6 to extend a considerable distance into the pressure-resisting column 1, but it may be made to extend thereinto any desired distance by excavating the earth a certain distance before commencing to drive the column-sections or by removing the earth from the interior of the column after it has been sunk.

The hydraulic apparatus illustrated in Figs. 1 and 2 is susceptible of being used as a temporary support for the wall 12 of an existing building or other structure by simply inserting one end portion of the horizontally-arranged beam or beams 9 into a recess formed in the wall, as shown, and then introducing the working fluid into the ram-cylinder beneath the disk or piston 7 of the ram, whereby the latter is raised to support the building-wall for any desired purpose. When the apparatus is used for supporting a superincumbent weight, such as the wall of an existing building, it is preferable to construct the apparatus as shown in the modification Fig. 3, wherein the upper end portion of the ram 6^a, having the disk or piston 7^a, is provided with a screw-thread 21, carrying on its upper projecting end a screw-nut 22 in such manner that after the ram has been raised to cause the beam or beams to engage and support the building-wall the nut can be screwed down upon the screw-threaded end of the ram until it bears or rests against the head 5^a on the upper end of the ram-cylinder 4^a. By this means the superincumbent weight is supported, even though the working fluid should leak from beneath the disk or piston 7^a of the ram or plunger 6^a.

The parts not specifically described in Fig.

3 are the same as described with reference to Figs. 1 and 2.

The screw-threaded upper end of the ram 6^a will be provided with the head 8^a. (Shown in detail Fig. 4.) This head is detachably secured to the upper end of the ram through the medium of a screw-bolt 23, and is provided with an angular opening for the reception of the beam or beams 9, the same as the construction shown in Figs. 1 and 2.

When the apparatus is employed to support the superincumbent weight of the wall of an existing building or other structure, the buried or sunk pressure-resisting column effectually supports the apparatus, as will be obvious.

In the modification Figs. 5 and 6 the pressure-resisting column 1, buried, driven, or sunk the required distance into the earth, is provided at its upper end with a rotating or revolving ram-cylinder 24, journaled on trunnions in arms 25, rising from a base-plate or platform 26, having a central sleeve or tubular journal 27, mounted in a socket 28, inserted into or connected with the upper end of the pressure-resisting column, so that the ram 24^a may be used to insert or drive needles or other supports under or into the wall of an existing building or other structure. By mounting the ram-cylinder on trunnions it can be adjusted to a horizontal position or to a vertical position, or to any angle of inclination to suit the conditions required for driving the needles or other supports into place for supporting the wall of the building.

The socket 28 is in the form of a flanged ring inserted into a short cylindrical section which is carried by the upper end of the pressure-resisting column, and the socket is attached to the short section by bolts or otherwise.

In the modification Fig. 7 the revolving ram on the upper end of the pressure-resisting column 1, which is buried, driven, or sunk into the earth, as before explained, is adapted to work in a horizontal plane and is rotatable or revoluble, so that the ram can be caused to operate on needles or other supports at any point in a circle concentric with or around the pressure-resisting column.

The hydraulic ram in Fig. 7 comprises a horizontal cylinder 29, swiveled into a head 30, which is secured to the upper end of the pressure-resisting column. The cylinder contains the ram 30^a, having the disk or piston 31. This construction of apparatus is more particularly designed for driving a needle or other wall-support horizontally under the wall 32 of an existing building or other structure for the purpose of permanently or temporarily supporting the latter or for underpinning purposes.

It will be observed that in the different forms of apparatus illustrated in the drawings all have features in common, to wit: First, there is present a pressure-resisting column buried,

driven, or sunk perpendicularly into the earth; second, a hydraulic ram mounted on the upper end of the buried, driven, or sunk pressure-resisting column; third, the ram is susceptible of rotating or revolving for the purpose of inserting or placing a wall-support at different or various points, and, fourth, the pressure-resisting column firmly and substantially resists the tendency of the ram-cylinder to move in any direction whatever.

An important and valuable feature of my invention resides in a pressure-resisting column buried, driven, or sunk perpendicularly into the earth and provided at its upper end with a hydraulic ram or fluid-actuated apparatus susceptible of being employed to drive or place in proper position suitable supports for the wall of a building or other structure.

Another important and valuable feature resides in the susceptibility of the ram rotating or revolving while the pressure-resisting column remains fixed in the earth for the purpose of inserting or placing wall or other supports at different or various points without in any manner depending upon the superincumbent weight of a building-wall or other structure as a means for resisting the upward pressure on the ram-cylinder while the ram is in operation.

When the apparatus shown in Figs. 1, 2, and 3 has been used to drive or sink the required number of columns, as at 10, and it is desired to withdraw the pressure-resisting column 1 from the earth, the hydraulic apparatus is detached from the upper end of the pressure-resisting column and a block of metal, stone, or wood is laid upon the earth in the upper end of the said column. The ram is then replaced in engagement with the upper end of the pressure-resisting column, with the lower end of the ram 6 or 6^a bearing against the said block of metal, stone, or wood. The disk or piston 7 or 7^a will then lie at or near the upper end of the ram-cylinder, and by admitting the working fluid above the disk or piston the fluid-pressure will raise the ram-cylinder, as the down motion of the ram is resisted and prevented by the block of metal, stone, or wood resting on the earth in the buried or sunk column. As the ram-cylinder rises it carries with it the pressure-resisting column, and the latter can thus be withdrawn section by section in a manner so obvious from the foregoing description that I do not deem it necessary to illustrate the order of procedure in the drawings. When the apparatus is adjusted for use to withdraw the pressure-resisting column or any other buried or sunken column, it is preferable to remove the collar-sections 13 and 14, the tie-rods or links 19, the heads 20, and the horizontal beam or beams.

The hydraulic apparatus illustrated in Figs. 5 and 6 can also be employed to withdraw the pressure-resisting column from the earth in a manner similar to the apparatus shown in Figs. 1, 2, and 3. When it is de-

sired to utilize the apparatus, Figs. 5 and 6, to withdraw the pressure-resisting column, the ram is turned to a perpendicular position, as indicated by dotted lines, Fig. 5. The base-plate or platform 26 is rigidly connected with the upper end of the pressure-resisting column through the medium of bolts or other devices, and the ram is forced downward, so that its lower end abuts the earth within the column or abuts the block inserted into the column, as described with reference to Figs. 1, 2, and 3. The pressure of the working fluid therefore causes the ram-cylinder to rise and carry with it the base-plate or platform 26, thus rendering it possible to withdraw a pressure-resisting column section by section from the earth, as will be understood without further explanation.

Having thus described my invention, what I claim is—

1. The combination of a pressure-resisting column buried or sunk in the earth, with a revolving hydraulic ram connected with the upper end portion of said column so that the latter holds the ram-cylinder against upward motion as the ram descends, substantially as described.

2. The combination of a pressure-resisting column buried or sunk in the earth, with a revolving hydraulic ram connected with the upper end portion of said column, a horizontally-arranged pressure-beam engaged with the upper end of the ram and extending laterally to act upon and drive wall or other supporting columns perpendicularly into the earth as the ram descends, substantially as described.

3. The combination of a pressure-resisting column buried in the earth, with a fluid-actuated ram mounted on and sustained by the said column and provided at its upper end with a horizontally-arranged beam, one end of which serves to engage and drive a wall-supporting column perpendicularly into the earth, substantially as described.

4. The combination of a pressure-resisting column buried in the earth, with a hydraulic ram rotatably connected with and sustained by the said column, and a horizontally-arranged beam engaged with the ram and extended laterally to bear against and drive a wall-supporting column perpendicularly into the earth, substantially as described.

5. The combination of a pressure-resisting column buried or sunk in the earth, with a fluid-actuated ram connected with and sustained by the said column, a head engaged with said ram, and a horizontally-arranged beam or beams held by said head and extended laterally to bear against and drive a wall-supporting column perpendicularly into the earth as said ram with its head descends, substantially as described.

6. The combination of a pressure-resisting column buried or sunk in the earth, with a fluid-actuated ram mounted on and sustained by said column, a head engaged with the upper end of the ram, a horizontally-arranged beam

carried by said head and extending laterally to bear against and drive a wall-supporting column perpendicularly into the earth, and braces connecting the said beam with a portion of the ram, substantially as described.

7. The combination of a pressure-resisting column buried or sunk in the earth, with a hydraulic-ram cylinder mounted on and sustained by the said column, a ram or plunger working in said cylinder, a head carried by the upper end of the ram or plunger, and a horizontally-arranged beam engaged with said head and extended laterally to bear against and drive a wall-supporting column perpendicularly into the earth, substantially as described.

8. The combination of a pressure-resisting column buried or sunk in the earth, with a hydraulic-ram cylinder mounted on and sustained by the said column, a ram or plunger working in said cylinder, a head carried by the upper end of the ram or plunger, a horizontally-arranged beam engaged with said head and extended laterally to bear against and drive a wall-supporting column perpendicularly into the earth, and tie-rods or links connecting the said beam with the ram-cylinder, substantially as described.

9. The combination of a pressure-resisting column buried or sunk in the earth, with a hydraulic-ram cylinder mounted on and sustained by the said column, a ram or plunger working in said cylinder, a head carried by the upper end of the ram or plunger, a horizontally-arranged beam engaged with said head and extended laterally to bear against and drive a wall-supporting column perpendicularly into the earth, two heads engaged with the said beam, a collar slidable on the ram-cylinder, and tie-rods or links connected with said two heads and with said collar, substantially as described.

10. The combination of a pressure-resisting column buried or sunk in the earth, with a ram-cylinder mounted on the upper end of the said column, a ram or plunger working in said cylinder and having a screw-threaded portion projecting from the upper end of the cylinder, and a screw-nut engaging the screw-threaded portion of the ram or plunger and adapted to rest against the upper end of the cylinder, substantially as described.

11. The combination of a pressure-resisting column buried or sunk in the earth, with a ram-cylinder mounted on the upper end of the said column, a ram or plunger working in said cylinder and having a screw-threaded portion projecting from the upper end of the cylinder, a screw-nut engaging the screw-threaded portion of the ram or plunger and adapted to rest against the upper end of the cylinder, a head carried by the upper end of the ram or plunger, and a horizontally-arranged beam engaged with said head and extending laterally, substantially as and for the purposes described.

12. The combination of a tubular pressure-resisting column composed of sections, buried or sunk in the earth, with a hydraulic ram mounted on and detachably connected with the upper end of said column, and means, substantially as described, whereby the ram-plunger can be held against descending and the ram-cylinder utilized for withdrawing the tubular pressure-resisting column, section by section, as set forth.

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

RICHARD S. GILLESPIE.

Witnesses:

ALBERT H. NORRIS,
THOS. A. GREEN.