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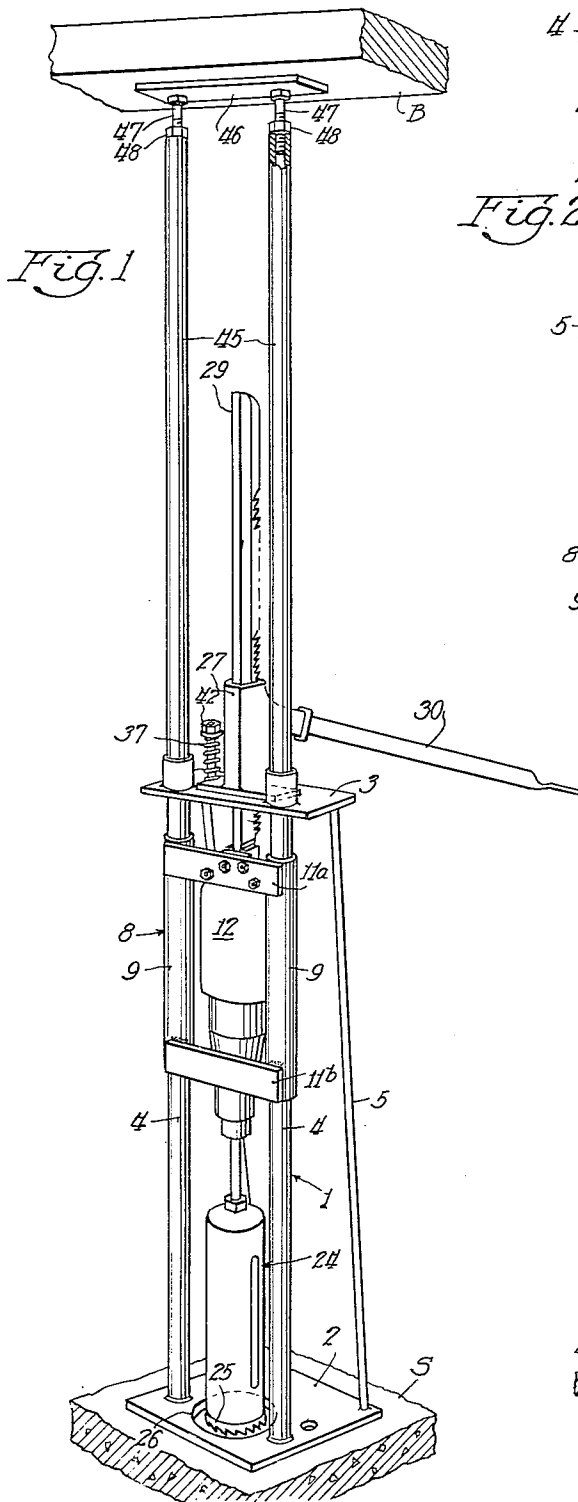
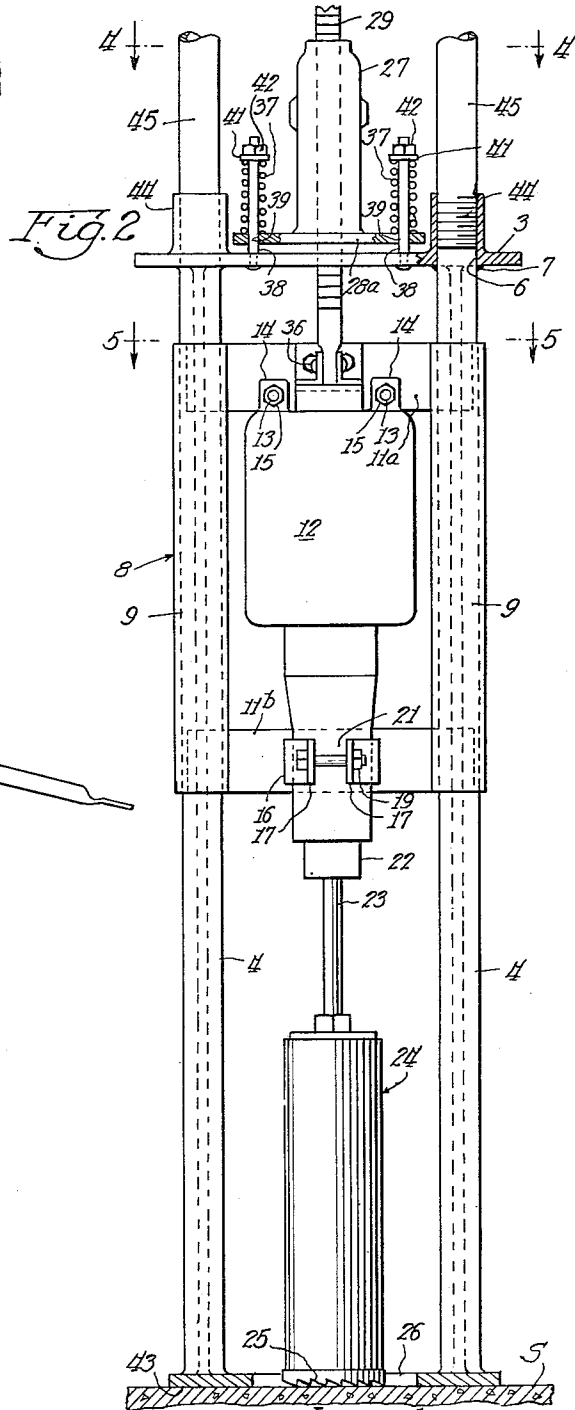
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DRILLING APPARATUS FOR CONCRETE AND THE LIKE

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DRILLING APPARATUS FOR CONCRETE AND THE LIKE

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18 Claims. (Cl. 125—20)

The invention relates generally to drilling devices and more particularly to a drill apparatus for use on masonry, concrete, and other similar materials.

In drilling through concrete and other similar materials, pneumatic or electric percussion tools have been commonly employed to perform such operations and, in addition thereto, rotary drill bits have been designed for use with rotary power sources, such type of tool recently becoming more popular. However, such rotary type of tools have not proved entirely satisfactory, particularly with drills of relatively large diameter. Normally, rotary bits are utilized with a portable drill or tool as, for example, the usual types of electric drills in cutting through concrete and the like. It will be apparent that in utilizing portable, manually-held tools of the present type that it is difficult to manually maintain the bit in proper position with respect to the object being drilled, as well as provide sufficient pressure to efficiently use the larger drill bits which normally are of "Carboloy" steel.

The present invention, therefore, has among its objects the production of a drill rig which will maintain the drill bit in accurate position with relation to the object being drilled, irrespective of the material and size of the drill bit employed, and which is so designed that adequate pressure is evenly applied to the drill bit to achieve efficient operation even when drilling through materials embodying steel reinforcements, etc.

Another object of the invention is the production of such a drill structure which may be operated at speeds of less than 150 R. P. M. thereby achieving best results with the "Carboloy" type of drill bit; thus, resulting in substantially eliminating drill breakage and considerably increasing maximum drill bit life.

A further object of the invention is the production of such a drill structure which is so designed that it may be firmly mounted with respect to the object being drilled, either by direct anchorage to the object, or by the use of extension members engaged with another object as, for example, an opposite wall, ceiling, or the like.

A further object of the invention is the production of such a drilling apparatus which is provided with means for applying pressure to the drill bit which is so constructed that a relatively even pressure is applied and in which shocks are absorbed when relatively hard obstructions, such as reinforcing rods, etc., are encountered in the drilling operation.

A further object of the invention is the production of such a drill apparatus which is compact, whereby it is completely portable and easily operated by one man, and which is relatively inexpensive to manufacture and very efficient for the purposes intended.

A further object of the invention is the production of such a drill rig which is so designed that holes may be drilled relatively close to obstructions, such as intersecting walls and the like.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

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To this end my invention consists in the novel construction, arrangement, and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts:

Fig. 1 is a perspective view of a drilling rig embodying the present invention, illustrating one method of securing the apparatus in operative position;

Fig. 2 is a rear elevational view of the structure illustrated in Fig. 1 with portions of the same broken away to show the details thereof;

Fig. 3 is a side elevational view of the drilling rig, illustrating the direct anchoring thereof to the object being drilled;

Fig. 4 is a sectional view taken approximately on the line 4—4 of Fig. 2; and

Fig. 5 is a sectional view taken approximately on the line 5—5 of Fig. 2.

The present invention contemplates the production of a drill structure which may be rigidly mounted on the object being drilled, whereby the drill bit is accurately maintained in operative alignment at all times, and which includes means, illustrated in the drawings as manually actuated means for applying pressure on the drill bit. Associated with the pressure-producing means is an energy storage mechanism which stores the energy derived by actuation of the pressure-producing means so that the latter may be intermittently actuated, following which the forces derived from such means are applied to the drill bit during the periods intervening between actuation of the pressure means. Such energy storage means also functions to absorb shocks transmitted from the drill bit to the power source and associated structure.

Referring to the drawings and particularly to Figs. 1 and 2, the reference numeral 1 indicates generally a base structure including a base plate 2 and an upper plate 3, and the latter being connected by a pair of vertically extending members or standards 4 and a pair of reinforcing or brace members 5. The members 4 and 5 may be secured to the respective plates 2 and 3 by any suitable means as, for example, welding or the like; and, as illustrated in Fig. 2, in the present embodiment of the invention the plate 3 is provided with bores 6 therein of a size to receive the upper ends of the standards 4 which are secured thereto by welding 7. Slidably mounted on the standards 4, which in the embodiment of the invention illustrated are cylindrical in cross-section, is a carriage structure indicated generally by the numeral 8, comprising a pair of sleeves 9, each of which is slidably mounted on a respective standard 4 with the sleeves 9 being rigidly connected by upper and lower cross members 11a and 11b.

Carried by the carriage structure 8 is a suitable power source, such as an electric motor 12, the latter in the embodiment of the invention illustrated being secured to the carriage 8 by bolts 13, passing through lugs 14 on the motor housing and upper cross member 11a, and nuts 15. The motor is also connected to the lower cross member 11b by means of a C-shaped clamp member 16 secured by welding or other suitable means to the cross member 11b and provided with clamping ears 17 through which extends a bolt 18, by means of which, together with a cooperating nut 19, clamping forces may be exerted on the portion 21 of the motor housing, thereby rigidly securing the motor in operative position on the carriage 8. Positioned at the lower end of and actuated by the motor 12, as viewed in Fig. 2, is a rotatable drill chuck 22 which may be of any suitable construction to receive and retain the shank 23 of a drill bit, indicated generally by the numeral 24, the latter being provided with annular cutting teeth 25 in the lower end face thereof. Normally,

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such drill bits are of hollow construction, and suitable bits for use with the present invention may be commercially procured. As illustrated in the drawings, the lower plate 2 is provided with an opening 26 therein of a size to permit the largest sized drill bit to be employed with the device to pass freely therethrough.

Positioned above the upper plate 3 is a pressure-producing structure indicated generally by the numeral 27, which in the embodiment of the invention illustrated is manually actuatable, the structure illustrated comprising a mechanical actuated mechanism of the type used on lifting jacks and the like, and consists of a suitable housing 28 in which is slidably mounted a vertically extending rack bar 29 adapted to be moved upwardly or downwardly with respect to the housing 27 by an actuating lever 30. The jack structure illustrated is of a type readily procurable on the open market, and the details of construction thereof form no part of the present invention.

The lower end of the rack member 29 is operatively connected to the carriage 8 by a bracket 31 which is provided with an upstanding flange 32 secured by bolts 33 and nuts 34 to the upper cross member 11a of the carriage, as clearly illustrated in Figs. 3 and 5. Mounted on the portion 33 of the bracket 31 are a pair of spaced lugs or ears 35 adapted to receive the adjacent end of the rack member 29 therebetween, the rack member being secured thereto by a bolt or pin 36 passing through aligned bores in the lugs 35 and rack member 29. The mechanism 27 is so designed that actuation of the handle 30 will move the rack member 29 downwardly, as illustrated in Figs. 1 and 2, thereby urging the carriage 8, motor 12, and drill bit 24 toward the surface S of the object to be drilled.

It will be apparent that the travel of the drill bit through the material being drilled is relatively slow and to provide for effective application of pressure to the carriage and drill bit, an energy storage mechanism or means is provided which is operative to store energy derived from actuation of the handle 30 and transmit such energy through the rack member 29 to the carriage structure, whereby only intermittent actuation of the handle is required to periodically load the energy storage mechanism, following which the latter will transmit such energy in the form of pressure to the carriage between the periods of actuation of the handle 30.

In the embodiment of the invention illustrated, such energy storage means comprises a pair of coiled compression springs 37 associated with the means for mounting the housing 28 to the base member 1. Referring particularly to Figs. 2, 3, and 4, the housing 28 is rigidly secured to a plate 28a; the latter, in the construction illustrated, being suitably welded to the housing 28, and the plate 28a in turn is operatively connected with the upper plate 3 of the base member by a pair of bolts or studs 38, extending upwardly from the plate 3 and passing through respective bores 39 in the plate 28.

Each of the springs 37 encircles one of the studs 38 with the lower ends of the springs, as viewed in Figs. 1 and 2, setting on the upper face of the plate 28a and the upper ends of the springs being retained in fixed relation with respect to the studs 38 by washers 41 and nuts 42. Thus, assuming the drill bit 24 is in engagement with the object to be drilled, actuation of the handle 30 will produce relative movement between the rack bar 29 and the housing 28, the rack bar 29 tending to move downwardly to urge the carriage 8 towards the object being drilled and the housing 28 upwardly away from the upper plate 3. As movement of the drill bit is restricted by the object to be drilled, the casing 28 will move upwardly in opposition to the springs 37 and thereby compress the latter. In other words, the energy resulting from actuation of the handle 30 is in effect stored in the springs 37 so that the latter will urge the housing 28 downwardly and with it the rack bar 29, carriage 8, motor 12, and drill bit 24. Consequently, as the drill bit

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24 is rotated, cutting away material in the object to be drilled, it will move downwardly under the action of the springs 37 and related structure. The springs 37 also function as an absorbing means for shocks transmitted from the object being drilled to the drill bit 24 and remainder of the actuating structure. Thus, while pressure is constantly applied to the drill bit, the entire operating structure of the device is free to move upwardly away from the object being drilled under the action of shock loads.

To assure proper application of pressure to the drill bit and prevent radial movement or tilting of the device with respect to the axis of the hole being drilled, means are provided for firmly and rigidly seating the base 1 and, in particular, the work-engaging face 43 thereof on the object to be drilled. Such means is illustrated in two different forms, in one of which the base member 1 is clamped in operative position by suitable means, such a construction being illustrated in Fig. 1; and, in the other, is directly anchored to the object itself by suitable bolts or the like, such a construction being illustrated in Fig. 3.

Referring to Figs. 1 and 2, the upper plate 3 is provided with a pair of internally threaded ferrules 44 rigidly connected by welding or other suitable means to the plate 3, such ferrules preferably being axially aligned with the standards 4 as illustrated. Threadedly engaged with the respective ferrules 44 are suitable extension members 45, which may be formed either from solid rod or, as illustrated may be formed from sections of pipe or the like. Suitably mounted on the upper ends of the extensions 45 is a pressure plate or bar 46 which, in the embodiment of the invention illustrated, is supported from the extensions 45 by a pair of downwardly extending studs 47 which extend into the bores of the pipe extensions 45. The studs 47 are maintained in operative position by adjusting nuts 48 threaded on the studs 47, whereby the plate 46 may be moved toward or away from the adjacent ends of the extensions 45 by rotating the nuts 48 to extend or retract the studs in the pipe extensions. This construction is particularly adapted for use where two opposed surfaces are available, between which the drill rig may be wedged or clamped, thus firmly anchoring the same in position. For example, assuming that the device is to be utilized in drilling a hole in the surface S of a floor or the like and a ceiling extends above the floor, the pressure plate 46 may be operatively engaged with such ceiling, either directly or through a suitable block B or other means for distributing the stresses applied to the ceiling, by utilizing extensions 45 of a suitable length to span the distance between the plate 46 and the base member 3. Thus, in utilizing the device in such a situation, the base member 1 would be accurately positioned on the surface S to position the axis of the drill bit 24 over the center of the hole to be drilled, following which extensions 45 of suitable length would be attached to the base 1 by threading the same into the ferrules 44 and the pressure plate 46 engaged with the block B or directly with the ceiling, as the case may be, by rotating the nuts 48 in a direction to raise the studs 47 and pressure plate 46. The nuts 48 are turned sufficiently to rigidly wedge or clamp the entire structure in operative position to drill the desired hole, following which the motor 12 is actuated and pressure applied to the drill bit by means of the handle 30. If desired, a number of differently shaped pressure plates 46 may be provided to enable proper engagement of the device with various shaped ceilings or objects; and obviously if desired, the plate 46 could be constructed of an intermediate member, such as the block B. As previously mentioned, actuation of the handle 30 will result in upward movement of the casing 28 and compression of the springs 37, which will then transmit the energy stored therein to the carriage 8 to urge the bit 24 into engagement with the material being drilled. As the bit 24 moves into the object being drilled, it will be neces-

sary to periodically actuate the handle 30 whereby a reasonably uniform or even pressure is applied to the drill bit throughout the drilling operation. In the event that the bit 24 strikes a reinforcing rod or any other relatively hard object, any upward shocks on the bit 24 will be transmitted to the springs 37 which will absorb such shock loads whereby the same are not directly transmitted to the base member 1 and associated structure.

As the device accurately maintains the drill bit in proper position at all times, desirable slow operating speeds may be employed, as for example, less than 150 R. P. M. resulting in most efficient drilling and prolonging the drill bit life.

Fig. 3 illustrates the application of the invention to an object wherein no oppositely disposed wall or surface is available so that the anchoring means, illustrated in Fig. 1 cannot be employed. In this application of the invention, the base 1 is anchored directly to the surface S' of the object to be drilled as, for example, an outside wall or the like. In this case, the object to be drilled is provided with two small bores 49, only one of which is shown in Fig. 3, which are aligned with suitable holes 51 in the base plate 2, the bores 49 being so positioned in the object to be drilled that the axis of the bit 24 will fall on the center of the hole to be drilled. Following the formation of the bores 49, suitable expansion bolts 52 or the like may be rigidly anchored in such bores, following which the base member 1 is positioned, as illustrated in Fig. 3, with the ends of the bolts 52 extending through the openings 51 in the plate 2, and the latter firmly clamped to the surface S by nuts 53 threaded on the expansion bolts 52. Once the anchoring operation has been completed, the drilling operation will be the same as that heretofore described.

Normally, the bits employed for cutting concrete and the like are of a hollow type and are provided with a suitable opening 54 through which the material removed during the drilling operation can be discharged from the drill bit interior. However, any suitable drill bit may be employed. It will be noted that the position of the drill bit with respect to the plate 2 is such that the edge 55 thereof may be closely positioned adjacent a transversely extending wall or other object so that the device may be used in relatively close quarters; and, in drilling rigs embodying the present invention of a size to take up to a four and one-half inch drill bit, holes may be drilled within three and one-quarter inches from an adjacent wall to the center of the hole being drilled.

It will be noted from the above description that the present invention effectively prevents any tilting or cocking of the drill bit relative to the object being drilled; and, combined with the utilization of relatively uniform or evenly applied pressure to the drill bit and slow speed of the drill, very efficient drilling action is achieved, both as to the time required to perform a drilling operation as well as a reduction in drill wear to a minimum. Tests with the present apparatus indicate that drilling time may be reduced as much as four-fifths over hand-operated power drills and that the drill life may be increased by more than ten times.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. In a portable drill rig for masonry and the like, the combination of a base member including spaced standards and a flat work-engaging face, a carriage slidably mounted on the spaced standards of the base member for movement perpendicular to said work-engaging face, a

power source carried by said carriage having drill-receiving means whereby a drill bit may be rotated about an axis perpendicular to said work-engaging face, the latter having an opening therein through which the drill bit may pass an upper plate operatively connected to the spaced standards, reciprocally actuated pressure producing means operatively carried by said base member and operatively connected to the upper plate, and energy storing means operatively related to said pressure producing means and operatively connected to the upper plate for storing energy produced by the pressure producing means and applying such energy to said carriage in a direction to urge the latter toward said work-engaging face.

2. In a portable drill rig for masonry and the like, the combination of a base member adapted to be rigidly positioned on the work to be drilled and including spaced standards and an upper plate operatively connected to the spaced standards, a drilling structure including a bit-receiving member carried by said base member for movement toward and away from such an object through a predetermined range of travel, power means for actuating said bit-receiving member, operator operated pressure means operatively mounted on the spaced standards for applying pressure to said bit-receiving member in a direction to urge the latter toward the work to be drilled through the normal range of travel of said drilling structure, and energy storage means operatively related to said pressure means and operatively connected to the upper plate for applying pressure produced by such means to the carriage, said range of travel being greater than the capacity of said energy storage means.

3. In a drill rig for masonry and the like, the combination of a base member including an upper plate and a flat work-engaging plate, a pair of standards operatively connected to said plates and arranged transversely with respect to the plates, a carriage slidably mounted on said standards, a power source carried by said carriage having drill-receiving means, said flat work-engaging plate having an opening therein through which the drill may pass, pressure means operatively connected to the upper plate for applying pressure to said carriage in a direction to urge the latter toward said work-engaging face, and energy storage means operatively connected to said upper plate and operatively related to said pressure means and carriage for applying pressure produced by said pressure means to the carriage.

4. In a drill rig for masonry and the like, the combination of a base structure including an upper plate and a lower planar work-engaging portion, a tool-receiving member rotatable on an axis extending perpendicular to the plane of such work-engaging portion, power means for rotating said tool-receiving member, means carried by said base member for operatively supporting said rotatable tool-receiving member for movement along its axis, a pressure producing mechanism and an energy storage means operatively connected to said upper plate and in series between said base structure and said tool-receiving member whereby the forces produced by actuation of said pressure producing mechanism is stored in said storage means and applied therefrom to said tool-receiving member to urge the latter axially toward said plane.

5. In a portable drill rig for masonry and the like, the combination of a base structure including spaced standards and an upper plate and a lower work-engaging portion operatively mounted on the spaced standards, a power source having a rotatable tool-receiving member rotatable on an axis extending at an angle to said work-engaging portion, means carried by said base member operative to support said power source whereby the latter and said rotatable tool-receiving member are axially movable, a pressure producing mechanism including energy storage means operatively connected to the upper plate and in series between said base structure and said tool-receiving member whereby the forces produced by actuation of said pressure producing mechanism is stored in said storage means and applied therefrom to

said tool-receiving member to urge the latter axially toward said work-engaging portion.

6. In a drill rig for masonry and the like, the combination of a base structure including an upper plate and a lower planar work-engaging portion, a power source having a rotatable tool-receiving member rotatable on an axis extending perpendicular to the plane of said work-engaging portion, means carried by said base member operative to support said power source whereby the latter and said rotatable tool-receiving member are axially movable, a pressure producing mechanism and energy storage means operatively connected to said upper plate and in series between said base structure and said tool-receiving member whereby the forces produced by actuation of said pressure producing mechanism is stored in said storage means and applied therefrom to said tool-receiving member to urge the latter axially toward said plane, and means for maintaining the work-engaging surfaces of said base structure immobile relative to the work to be drilled.

7. In a drill rig for masonry and the like, the combination of a base structure including an upper plate and a lower work-engaging portion, a power source having a rotatable tool-receiving member rotatable on an axis extending transversely to said work-engaging portion, means carried by said base member operative to support said power source whereby the latter and said rotatable tool-receiving member are axially movable, a pressure producing mechanism including energy storage means operatively connected to the upper plate and in series between said base structure and said tool-receiving member whereby the forces produced by actuation of said pressure producing mechanism is stored in said storage means and applied therefrom to said tool-receiving member to urge the latter axially toward said plane, and cooperating means on said base member and the work to be drilled for rigidly connecting the same.

8. In a drill rig for masonry and the like, the combination of a base structure including an upper plate and a lower work-engaging portion, a power source having a rotatable tool-receiving member rotatable on an axis extending perpendicular to said work-engaging portion, means carried by said base member operative to support said power source whereby the latter and said rotatable tool-receiving member are axially movable, a reciprocally actuated pressure producing mechanism including energy storage means operatively connected to the upper plate and in series between said base structure and said tool-receiving member whereby the force produced by actuation of said pressure producing mechanism is stored in said storage means and applied therefrom to said tool-receiving member to urge the latter axially toward said work engaging portion, and means for applying pressure to said base structure in a direction toward the work to be drilled whereby the base structure is engaged in immobile relation with respect to such work.

9. In a drill rig for masonry and the like, the combination of a base member adapted to be rigidly positioned on the work to be drilled, a drilling structure including a bit-receiving member carried by said base member for movement toward and away from such an object, power means for actuating said bit-receiving member, means for applying pressure to said bit-receiving member in a direction to urge the latter toward the work to be drilled, energy storage means operatively related to said pressure means for applying pressure produced by such means to the drilling structure, and means for applying pressure to said base structure in a direction toward the work to be drilled comprising a pair of tubular extension members, said base structure having socket means of a size to receive the adjacent ends of said extension members, a pressure plate adjacent the opposite ends of said extension members, adapted to engage an object which is stationary with respect to the work being drilled, and having threaded studs adapted to be positioned in the ends of the extension members and threaded means on

said studs operatively engageable with said ends for moving the studs outwardly therefrom whereby the extension members may be placed under compression and the base structure is engaged in immobile relation with respect to such work.

10. In a drill rig for masonry and the like, the combination of a base member adapted to be rigidly positioned on the work to be drilled, said base member including an upper member and a lower work-engaging surface, a drilling structure including a bit-receiving member carried by said base member for movement toward and away from such an object, power means for actuating said bit-receiving member, pressure means for applying pressure to said bit-receiving member in a direction to urge the latter toward the work to be drilled operatively connected to said upper member, energy storage spring operatively connected to said upper member and said pressure means to said base member for applying pressure produced by such means to the carriage, and means for maintaining said work-engaging surface and said base structure immobile relative to the work to be drilled.

11. In a drill rig for masonry and the like, the combination of a base member adapted to be rigidly positioned on the work to be drilled, said base member including an upper member and a lower work-engaging surface, a drilling structure including a bit-receiving member carried by said base member for movement toward and away from such an object, power means for actuating said bit-receiving member, operator-operated means for applying pressure to said bit-receiving member in a direction to urge the latter toward the work to be drilled operatively connected to said upper member, a coiled compression spring connecting said pressure means to said base member for applying pressure produced by such means to the carriage, and means for rigidly connecting the base member to the work to be drilled.

12. In a drill rig for masonry and the like, the combination of a base member adapted to be rigidly positioned on the work to be drilled, said base member including an upper member, a drilling structure including a bit-receiving member carried by said base member for movement toward and away from such an object, power means for actuating said bit-receiving member, operator-operated means operatively connected to said upper member for applying pressure to said bit-receiving member in a direction to urge the latter toward the work to be drilled, energy storage means operatively connecting said pressure means to said base member for applying pressure produced by such means to the carriage, said energy storage means also operatively connected to said upper member, and means for applying pressure to said base structure in a direction toward the work to be drilled, whereby the base structure is engaged in immobile relation with respect to such work.

13. In a drill rig for masonry and the like, the combination of a base structure having a work-engaging face, a carriage slidably mounted on said base structure for movement perpendicular to said work-engaging face, power means carried by said carriage with the driving shaft thereof extending perpendicular to said work-engaging face, means carried by the motor driven shaft for operatively connecting a drill bit therewith, said base plate having an opening therein through which a drill bit may pass, a rack member having its lower end connected to said carriage and extending upwardly therefrom, means including a housing structure and a manually actuatable lever operatively related to said rack member and adapted to urge the latter in a direction toward said base plate, and means operatively connecting said housing structure to said base structure, said means including a pair of apertured lugs extending laterally from the housing structure, a pair of upwardly extending members engaged with said base structure and passing through the apertures in said lugs, a pair of compression springs, each encircling one of said guide members and having its lower

end engaging said lugs, and means on the upper ends of said guide members for restricting movement of the upper ends of said springs whereby the latter are operative to urge said housing structure toward the base structure.

14. In a drill rig for masonry and the like, the combination of a base structure comprising a base plate having a work-engaging face, an upper plate spaced from said base plate, a pair of standards extending perpendicular to the work-engaging face of said base plate and rigidly connecting the latter with said upper plate, bracing means operatively connecting said plates, a carriage including a pair of sleeve members slidably mounted on said standards, an upper and a lower cross member rigidly connecting said sleeve members, an electric motor carried by said carriage with the driving shaft thereof extending perpendicular to said work-engaging face, means rigidly connecting said motor to said upper cross member, a clamp ring carried by said lower cross member and engaged with a portion of said motor, means carried by the motor driven shaft for operatively connecting a drill bit therewith, said base plate having an opening therein through which the bit may pass, pressure producing means and energy storage means operatively related to said base structure and carriage for storing energy produced by said pressure means and applying such energy to said carriage in a direction to urge the latter toward said base plate.

15. In a drill rig for masonry and the like, the combination of a base structure comprising a base plate having a work-engaging face, an upper plate spaced from said base plate, a pair of standards extending perpendicular to the work-engaging face of said base plate and rigidly connecting the latter with said upper plate, bracing means operatively connecting said plates, a carriage including a pair of sleeve members slidably mounted on said standards, an upper and a lower cross member rigidly connecting said sleeve members, an electric motor carried by said carriage with the driving shaft thereof extending perpendicular to said work-engaging face, means rigidly connecting said motor to said upper cross member, a clamp ring carried by said lower cross member and engaged with a portion of said motor, means carried by the motor driven shaft for operatively connecting a drill bit therewith, said base plate having an opening therein through which a drill bit may pass, a transversely extending bracket carried by said upper cross member, a rack member having its lower end secured to said bracket and extending upwardly therefrom, said upper plate having an opening therein through which said rack member extends, means including a housing structure and a manually actuable lever operatively related to said rack member and adapted to urge the latter in a direction toward said base plate, and means operatively connecting said housing structure to said upper plate, said means including a pair of apertured lugs extending laterally from the housing structure, a pair of upwardly extending members engaged with said upper plate and passing through the apertures in said lugs, a pair of compression springs, each encircling one of said guide members and having its lower end engaging said lugs, and means on the upper ends of said guide members for restricting movement of the upper ends of said springs whereby the latter are operative to urge said housing structure toward the upper plate.

16. In a drill rig for masonry and the like, the combination of a base structure comprising a base plate having a work-engaging face, an upper plate spaced from said base plate, a pair of standards extending perpendicular to the work-engaging face of said base plate and rigidly connecting the latter with said upper plate, bracing means operatively connecting said plates, a carriage including a pair of sleeve members slidably mounted on said standards, an upper and a lower cross member rigidly connecting said sleeve members, an electric motor carried by said carriage with the driving shaft thereof extending perpendicular to said work-engaging face, means rigidly con-

necting said motor to said upper cross member, a clamp ring carried by said lower cross member and engaged with a portion of said motor, means carried by the motor driven shaft for operatively connecting a drill bit therewith, said base plate having an opening therein through which a drill bit may pass, a transversely extending bracket carried by said upper cross member, a rack member having its lower end secured to said bracket and extending upwardly therefrom, said upper plate having an opening therein through which said rack member extends, means including a housing structure and a manually actuable lever operatively related to said rack member and adapted to urge the latter in a direction toward said base plate, and means operatively connecting said housing structure to said upper plate, said means including a pair of apertured lugs extending laterally from the housing structure, a pair of upwardly extending members engaged with said upper plate and passing through the apertures in said lugs, a pair of compression springs, each encircling one of said guide members and having its lower end engaging said lugs, and means on the upper ends of said guide members for restricting movement of the upper ends of said springs whereby the latter are operative to urge said housing structure toward the upper plate, and means for maintaining said work-engaging surfaces, said base structure immobile relative to the work to be drilled.

17. In a drill rig for masonry and the like, the combination of a base structure comprising a base plate having a work-engaging face, an upper plate spaced from said base plate, a pair of standards extending perpendicular to the work-engaging face of said base plate and rigidly connecting the latter with said upper plate, bracing means operatively connecting said plates, a carriage including a pair of sleeve members slidably mounted on said standards, an upper and a lower cross member rigidly connecting said sleeve members, an electric motor carried by said carriage with the driving shaft thereof extending perpendicular to said work-engaging face, means rigidly connecting said motor to said upper cross member, a clamp ring carried by said lower cross member and engaged with a portion of said motor, means carried by the motor driven shaft for operatively connecting a drill bit therewith, said base plate having an opening therein through which a drill bit may pass, a transversely extending bracket carried by said upper cross member, a rack member having its lower end secured to said bracket and extending upwardly therefrom, said upper plate having an opening therein through which said rack member extends, means including a housing structure and a manually actuable lever operatively related to said rack member and adapted to urge the latter in a direction toward said base plate, and means operatively connecting said housing structure to said upper plate, said means including a pair of apertured lugs extending laterally from the housing structure, a pair of upwardly extending members engaged with said upper plate and passing through the apertures in said lugs, a pair of compression springs, each encircling one of said guide members and having its lower end engaging said lugs, and means on the upper ends of said guide members for restricting movement of the upper ends of said springs whereby the latter are operative to urge said housing structure toward the upper plate, and means passing through said base plate for rigidly connecting the base member to the work to be drilled.

18. In a drill rig for masonry and the like, the combination of a base structure comprising a base plate having a work-engaging face, an upper plate spaced from said base plate, a pair of standards extending perpendicular to the work-engaging face of said base plate and rigidly connecting the latter with said upper plate, bracing means operatively connecting said plates, a carriage including a pair of sleeve members slidably mounted on said standards, an upper and a lower cross member rigidly connecting said sleeve members, an electric motor carried by said carriage with the driving shaft thereof extending perpendicular to

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said work-engaging face, means rigidly connecting said motor to said upper cross member, a clamp ring carried by said lower cross member and engaged with a portion of said motor, means carried by the motor driven shaft for operatively connecting a drill bit therewith, said base plate having an opening therein through which a drill bit may pass, a transversely extending bracket carried by said upper cross member, a rack member having its lower end secured to said bracket and extending upwardly therefrom, said upper plate having an opening therein through which said rack member extends, means including a housing structure and a manually actuatable lever operatively related to said rack member and adapted to urge the latter in a direction toward said base plate, and means operatively connecting said housing structure to said upper plate, said means including a pair of apertured lugs extending laterally from the housing structure, a pair of upwardly extending members engaged with said upper plate and passing through the apertures in said lugs, a pair of compression springs, each encircling one of said guide members and having its lower end engaging said lugs, and means on the upper ends of said guide members for restricting movement of the upper ends of said springs whereby the latter are operative to urge said housing struc-

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ture toward the upper plate, and means for applying pressure to said base structure in a direction toward the work to be drilled comprising a pair of tubular extension members, said upper plate having socket means of a size to receive the adjacent ends of said extension members whereby the latter are axially aligned with said standards, a pressure plate adjacent the opposite ends of said extension members, adapted to engage an object which is stationary with respect to the work being drilled and having threaded studs adapted to be positioned in the ends of the extension members and threaded means on said studs operatively engageable with said ends for moving the studs outwardly therefrom whereby the extension members may be placed under compression and the base structure is engaged in immobile relation with respect to such work.

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