

(No Model.)

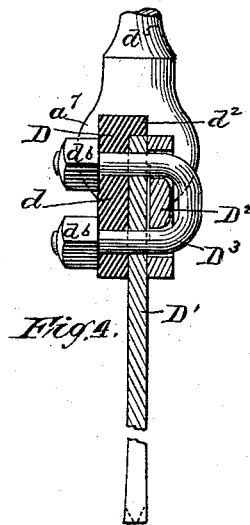
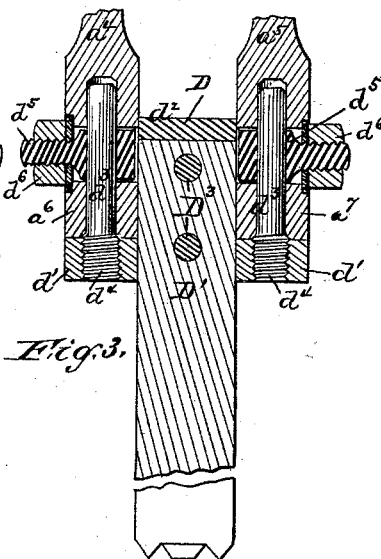
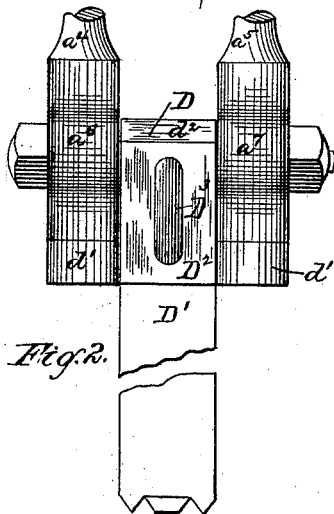
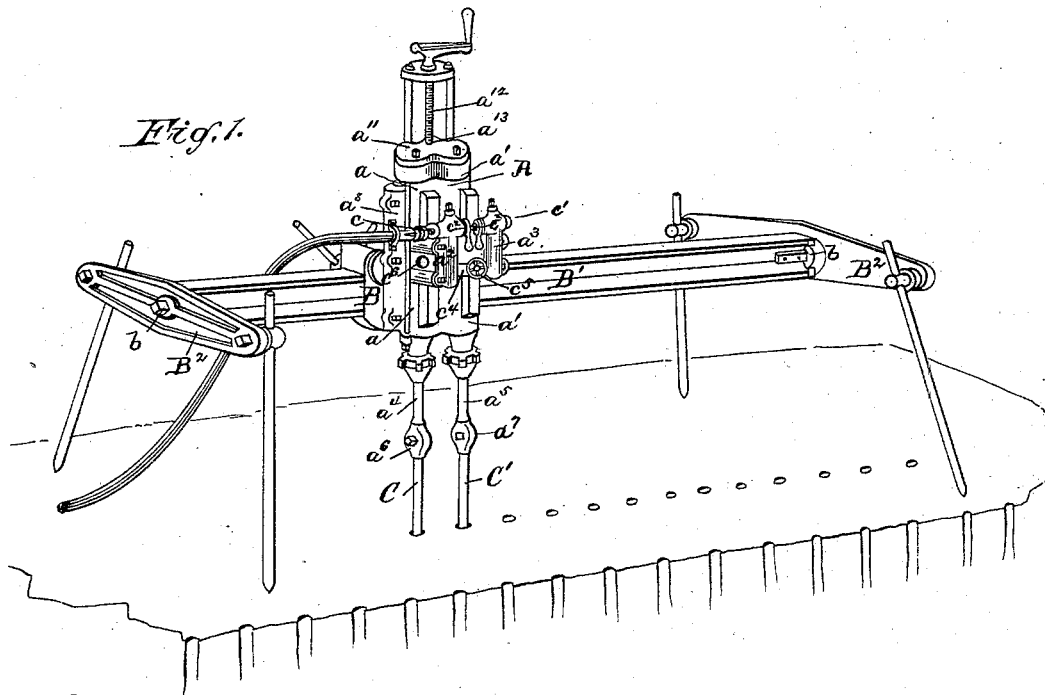
2 Sheets—Sheet 1.

J. C. GITHENS.

ROCK DRILLING AND CHANNELING MACHINE.

No. 421,491.

Patented Feb. 18, 1890.



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(No Model.)

2 Sheets—Sheet 2.

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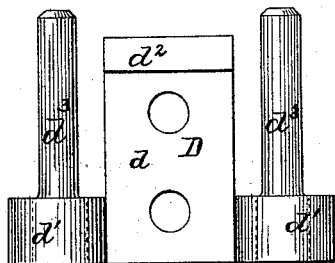


Fig. 5.

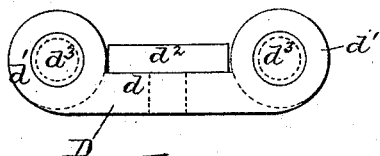


Fig. 6.

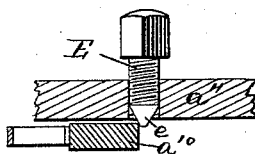


Fig. 8.

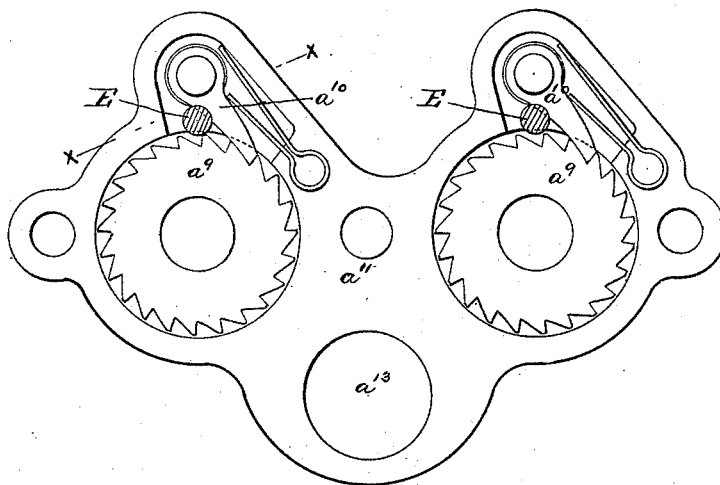


Fig. 7.

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UNITED STATES PATENT OFFICE.

JOSEPH C. GITHENS, OF NEW YORK, N. Y., ASSIGNOR TO THE RAND DRILL COMPANY, OF NEW YORK.

ROCK DRILLING AND CHANNELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 421,491, dated February 18, 1890.

Application filed February 11, 1888. Renewed July 24, 1889. Serial No. 318,551. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH C. GITHENS, of the city, county, and State of New York, a citizen of the United States, have invented certain new and useful Improvements in Rock Drilling and Channeling Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to machines for drilling and channeling rock—such, for example, as are employed in quarrying; and my invention consists, primarily, in the combination, with the drill-stocks of a double or twin drill, of a cross-head detachably attached thereto, and adapted to carry a channeling-bit, whereby the twin drills may at pleasure be operated—one or both—to drill round holes by means of the usual drill-bits attached to the drill-stocks, or be operated simultaneously to cut a channel by means of a channeling-bit carried by the cross-head attached to the drill-stocks, the said usual drill-bits being detached therefrom; and my invention furthermore consists, subordinately, in the devices and their combinations hereinafter described, by means of which the stated object of the invention is desirably attained, all substantially as hereinafter set forth.

Figure 1 is a front elevation, in perspective, of a twin drill such as may be employed for the purposes of this invention, and showing the same mounted upon a quarry-bar with the usual cylindrical drill-bits attached to the drill-stocks. Fig. 2 is an enlarged view, in front elevation, of the lower or chuck ends of the drill-stocks of the twin drill shown in Fig. 1, and showing a cross-head attached to and uniting the drill-stocks and a channeling-bit carried thereby. Fig. 3 is a vertical central section of the part shown in Fig. 2. Fig. 4 is a similar section of the same, taken at right angles to the section shown in Fig. 3. Fig. 5 is a front elevation of the detached cross-head. Fig. 6 is a lower end view or plan of the same. Fig. 7 is an enlarged plan of the top of the twin-cylinders, the cover being removed and disclosing the rotating mechanism for each piston and a device which may be employed to

disengage the pawls of the ratchets and thus prevent the rotation of the drill-rods when the channeling-bit is being operated. Fig. 8 is a vertical cross-section on the line xx , Fig. 7.

A, Fig. 1, is a twin drill having the two cylinders $a a'$, which may be made in the same piece of metal and each having a valve-chest $a^2 a^3$, respectively. The drill-stocks $a^4 a^5$ are preferably continuations of the piston-rods—one in each drill—and they are similar, as shown, and each is provided with or has formed upon it at its lower end a chuck $a^6 a^7$, respectively. The twin drill is shown mounted to slide longitudinally in a shell a^8 , which is desirably pivoted to a frame B, that is shown mounted upon and arranged to move longitudinally of a quarry-bar B' , which bar may be rotatable, and hence adjustable, on its end bearings b in a suitable supporting-frame B^2 . Each of the twin drills is shown as having an independent rotating mechanism for its piston and the drill-stock carried thereby, and the same is indicated in Fig. 7 by the well-known ratchet-wheels a^9 and their spring-pawls a^{10} —one for each piston—and seated in suitable recesses in a head a^{11} , which may be common to both cylinders, as shown. A single feed-screw a^{12} , working in the threaded aperture a^{13} in the common head a^{11} , will serve to feed the twin cylinders and their parts with the desired movement thereof in the shell a^8 .

It is of course necessary that the pistons and the drill-stocks of the twin drill should be capable of simultaneous reciprocatory movement when the cross-head and its channeling-bit, hereinafter described, are attached thereto; and to effect this, and at the same time provide for the independent operation of each of the twin drills when desired, I have devised and preferably employ the following arrangement of ports and valves for the cylinders and their valve-chests.

I give each valve-chest a^2 and a^3 a steam or air inlet c and c' , respectively; and these inlets are controlled independently and respectively by the valves indicated at c^2 and c^3 . At c^4 is indicated a steam or air connection between the two chests and controlled by a valve c^5 . Each chest has an independent exhaust, such as shown at c^6 . By means of this arrangement it is evident that steam

or air may be supplied through either inlet, and a circulation to both chests be established by opening the valve c^5 , and thus the operation of both drills simultaneously be secured; or that steam or air may be admitted through inlet c or c' , and, the valve c^5 being closed, the chest and cylinder to which the steam or air is thus supplied will alone be operated, the other drill being cut off and remaining inert. The usual cylindrical drill-bits C and C' (shown seated in and held by the chucks of the respective drill-stocks a^4 and a^5 , may thus be employed independently or simultaneously to drill round holes; or, the said drill-bits being detached from the chucks, the drill-stocks are ready to receive the cross-head, as hereinafter set forth, and to be operated simultaneously in working the channeling-bit, as hereinafter specified.

As hereinbefore stated, the principal feature of my invention is the combination, with the drill-stocks of a twin drill, of a cross-head detachably attachable thereto and adapted to carry a channeling-bit, which may thus be operated by the united power of the two pistons of the twin drill.

At D is shown a cross-head such as I find it preferable to employ. The cross-head shown consists in a plate d , adapted to fit closely edgewise between the twin-drill stocks a^4 and a^5 and the wings or lugs d' provided or formed at the opposite edges on the lower end of said plate, and adapted to fit to and against the ends of the chucks carried by the drill-stocks. The plate d and its lugs d' may be formed as a forging from one and the same piece of metal, as shown. The plate d preferably has at its top edge an overhung lip or shoulder d^2 , against which the channeling-bit may abut when seated on the plate, and which may be a part of the described forging. The lugs d' are each provided with an upwardly-projecting pin d^3 , adapted to enter and be seated in the holding-chucks a^6 and a^7 , one in each, on the respective ends of the drill-stocks. These pins are preferably made separately from the lugs and with their thickened lower ends, which are screw-threaded and thus screw-seated, in correspondingly-threaded apertures in the lugs, as shown at d^4 . By means of these pins d^3 the cross-head is detachably fitted to and secured upon the drill-stocks, the pins passing into the chucks, as shown, and therein through the transversely-bored clamping-bolts d^5 , which are controlled by the nuts d^6 , as shown. The clamping bolts and their nuts are the same as serve to hold the drill-bits C and C' in the respective chucks, and the described cross-head may thus be attached to the twin-drill stocks by simply withdrawing the drill-bits from the chucks and inserting the pins d^3 of the cross-head, or vice versa.

The channeling-bit D' rests flatwise upon the plate d , and desirably abuts at its upper end against the shoulder d^2 , as stated, and it

may be held in place by a cap D^2 , imposed upon the seated end of the bit, and a U-bolt D^3 passed transversely through the cap, bit, and plate, which are coincidentally bored through for the purpose, said bolt D^3 having the clamping-nuts d^7 , as shown.

It should be understood that I do not limit myself to the precise form of cross-head herein shown and described, nor to the described means for attaching the same detachably to the twin-drill stocks, nor to the means shown for attaching the channeling-bit to the cross-head. The form of the cross-head may be varied without material departure from the primary feature of my invention, and the means for attaching the same to the twin-drill stocks may be altered to suit or conform to the style of chuck employed on the drill-stocks, while any known and suitable device may be used to secure the channeling-bit to the cross-head. I find, however, that the cross-head shown and the chucks described, as well as the U-bolt specified for holding the channeling-bit, are simple, desirable, and effective means for carrying out my invention.

It is evident that when the channeling-bit is being operated by the twin drills it is essential that the pistons of each drill should be free to reciprocate in their respective cylinders without the rotation which is customarily given them when each piston operates a cylindrical drill-bit attached to the rod or drill-stock thereof. I have therefore provided means by which the rotating ratchet-wheels a^9 may be disengaged of their pawls a^{10} , consisting in a set-screw E , seated in the head a^{11} , one for each pawl, as shown in Fig. 7, and projecting exteriorly of said head, as shown in Figs. 1 and 8, and having a conical or beveled bearing end e , engaging the face of the pawl adjacent to the ratchet. The incline or angle of the bevel should be such that when the set-screw is turned down past the pawl it will force or move the pawl sufficiently backward to enable its free end to clear the teeth on the ratchet. The pawls may thus be disengaged when the channeling-bit is being operated by the twin drills, and may be re-engaged to their ratchets when the twin drills are operated singly or together to work the usual cylindrical drill-bit of each.

In practical operation the twin drill containing my invention is desirably mounted upon the quarry-bar, as shown in Fig. 1, and one of the drills, fitted with a cylindrical bit, may be employed to drill a hole at one end of the ledge or platform of rock, after which the other drill may be employed to drill a similar hole at the opposite end of the ledge, and then the bits may be removed, the cross-head and channeling-bit attached, and said bit be operated by both the twin drills to cut or channel the rock on a line between the holes from one to the other. If desired, the twin drills may operate two cylindrical bits at once, drilling two holes simultaneously

along the line of the desired cut, and then they may be replaced by the cross-head and channeling-bit, and the other thereby channeled or cut between adjacent holes.

5 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a rock drilling and channeling machine, the combination, with the drill-stocks of a double or twin rock-drill capable of simultaneous reciprocatory motion, of a cross-head detachably attachable to said drill-stocks, and adapted to carry a channeling-bit, substantially as and for the purpose specified.

2. In a rock drilling and channeling machine, the combination, with the drill-stocks of a double or twin rock-drill adapted to carry each a single drill-bit and to have an independent and a simultaneous reciprocatory motion, of a cross-head detachably attachable to said drill-stocks, and adapted to carry a channeling-bit, substantially as and for the purpose specified.

3. In a rock drilling and channeling machine, the combination, with the drill-stocks of a double or twin rock-drill capable of simultaneous reciprocatory motion and provided with drill-holding chucks at their lower ends, of a cross-head provided with arms or pins adapted to be seated in and clamped to said chucks, and to carry a channeling-bit, substantially as and for the purpose specified.

4. In a rock drilling and channeling machine, the combination, with the drill-stocks of a double or twin rock-drill capable of simultaneous reciprocatory motion and provided with chucks at their lower ends having tool holding and clamping devices for detachably attaching the drill-tools thereto, of a cross-head adapted to carry a channeling-bit, and provided with arms or pins adapted to be seated in and detachably attached to said chucks by said drill-tool-clamping devices, and interchangeably with said tools, substantially as and for the purpose specified.

5. In a rock drilling and channeling machine, the combination, with the tool-holding chucks of the drill-stocks of a double or twin rock-drill capable of simultaneous reciprocatory motion and provided with tool-clamping devices to attach the drill-tools detachably thereto, of a cross-head adapted to fit between said chucks and carry a channeling-bit, and provided with lugs adapted to fit against the ends of the chucks, and with arms or pins carried by said lugs and adapted to be seated in said chucks, and clamped thereto

by said drill-tool-attaching devices, substantially as and for the purpose specified.

6. A cross-head for the drill-stocks of a twin rock-drill, consisting in a plate adapted to fit between the drill-stocks and to carry a channeling-bit, and provided with a shoulder against which said bit may abut when seated on said plate, and with lugs adapted to abut against the ends of said chucks, and arms or pins carried by said lugs and adapted to be seated in and clamped to said chucks, substantially as and for the purpose specified.

7. A cross-head for the drill-stocks of a twin rock-drill, consisting in a plate d , having an overhung shoulder d^2 , lugs d' , and pins or arms d^3 , screw-seated in said lugs, constructed as described, and for the purpose specified.

8. In a rock drilling and channeling machine, the combination, with the chucks of the drill-stocks of a double or twin rock-drill capable of simultaneous reciprocatory motion and provided with tool-holding bolts d^5 and their clamping-nuts d^6 , of a cross-head D , consisting in a plate d , adapted to fit between said chucks and to carry a channeling-bit, and provided with lugs d' , adapted to fit against the chuck ends, and with pins or arms d^3 carried by said lugs and adapted to be seated in said chucks and there held by said tool-holding bolts, substantially as and for the purpose specified.

9. In a cross-head adapted to be detachably attached to the drill-stocks of a double or twin rock-drill, the combination of the plate d , the channeling-bit D' , seated flatwise thereon, the cover D^2 , imposed on said bit, and the U-bolt D^3 , passed through coincident apertures in said plate, bit, and cover, together with the nuts d^7 , substantially as and for the purpose set forth.

10. The combination, with the piston-cylinders a a' of a double or twin rock-drill having, respectively, the valve-chests a^2 a^3 , of steam or air inlet ports c and c' , one for each chest, and each controlled independently by a valve c^2 c^3 , respectively, and a steam or air connection c^4 between the two chests, controlled by a valve c^5 , together with an independent exhaust-port c^6 for each chest, substantially as and for the purpose specified.

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Witnesses:

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A. T. FALES.