(No Model.) 4 Sheets—Sheet 1.

E. B. COXE & S. SALMON.

MECHANISM FOR DRILLING.

No. 483,903. Patented Oct. 4, 1892.

Fig. 1.

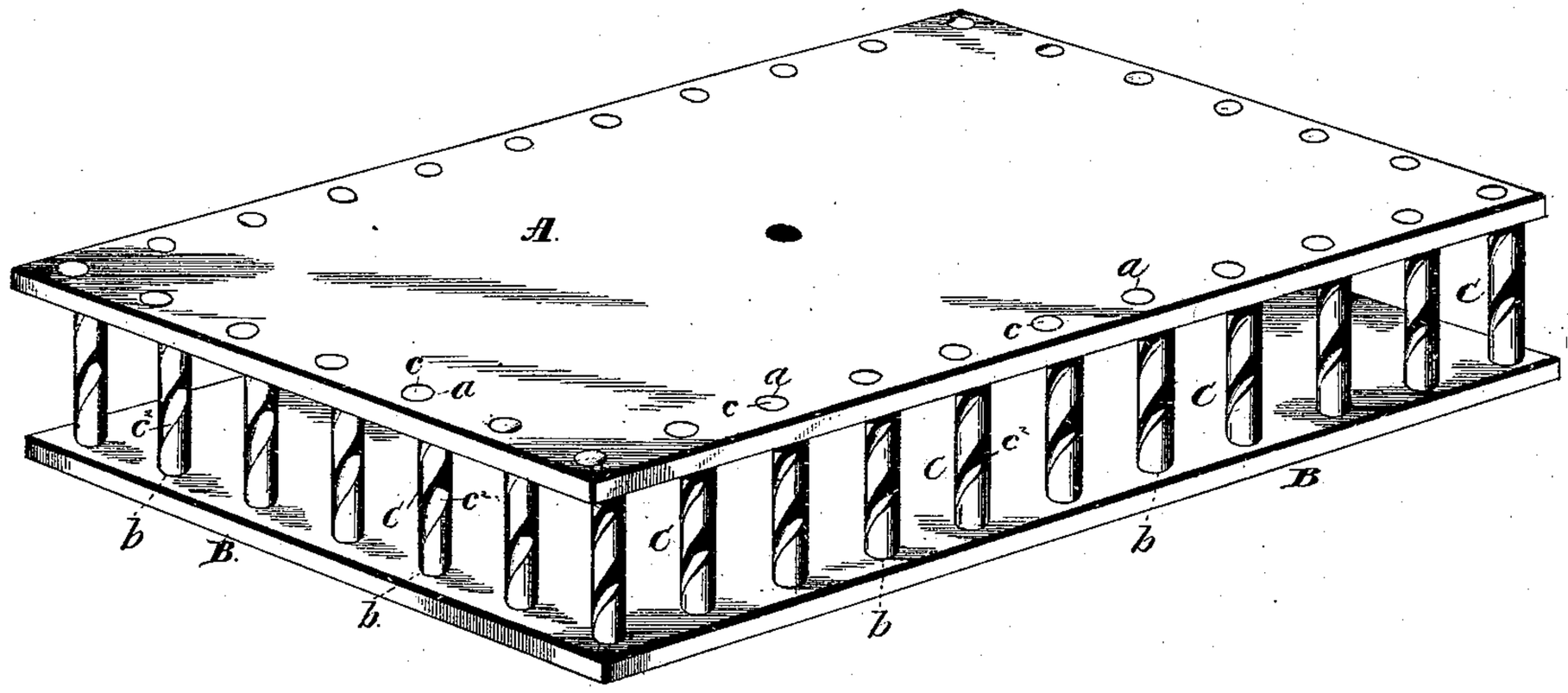
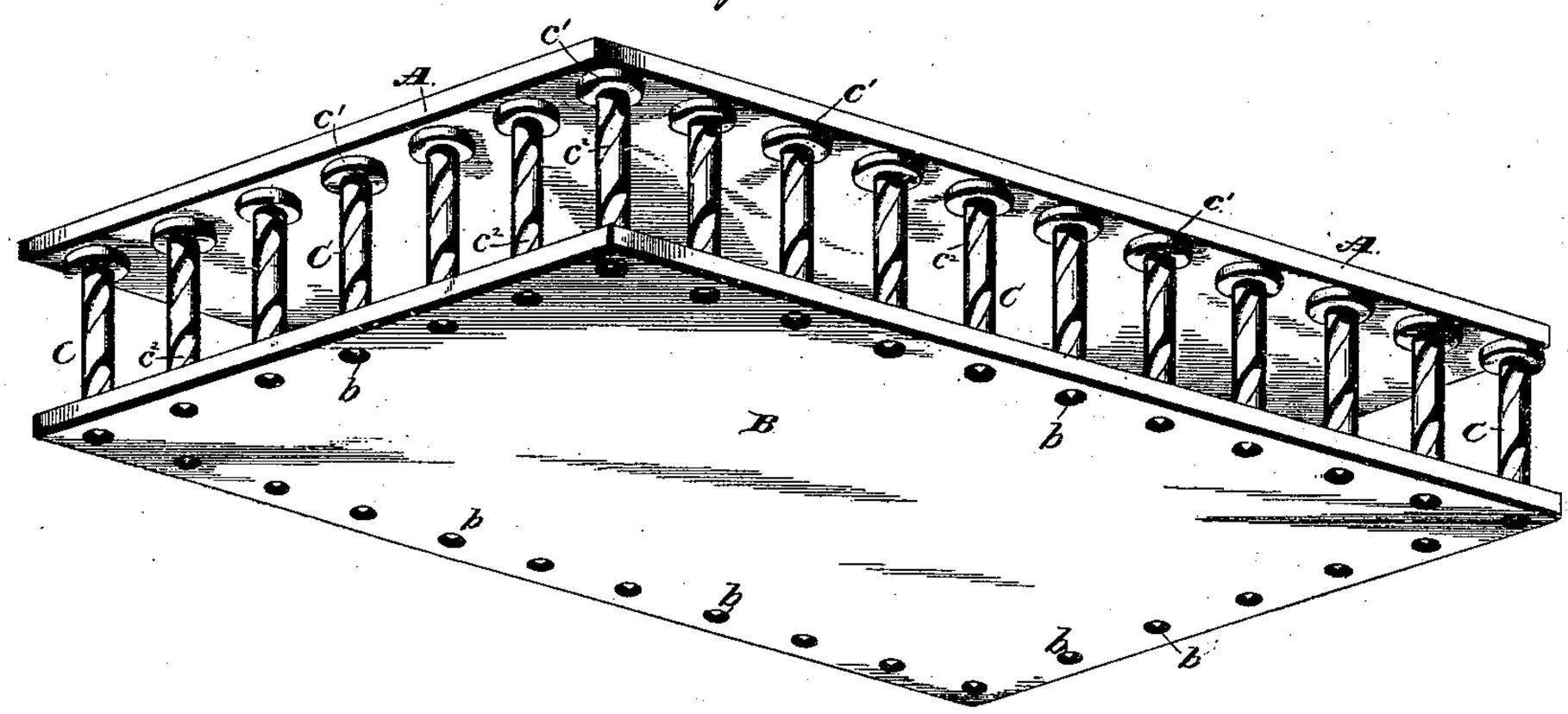


Fig. 2.



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Jas. E. Hutchinson.

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Crindle and Russell, their Attys

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Fig. 3.

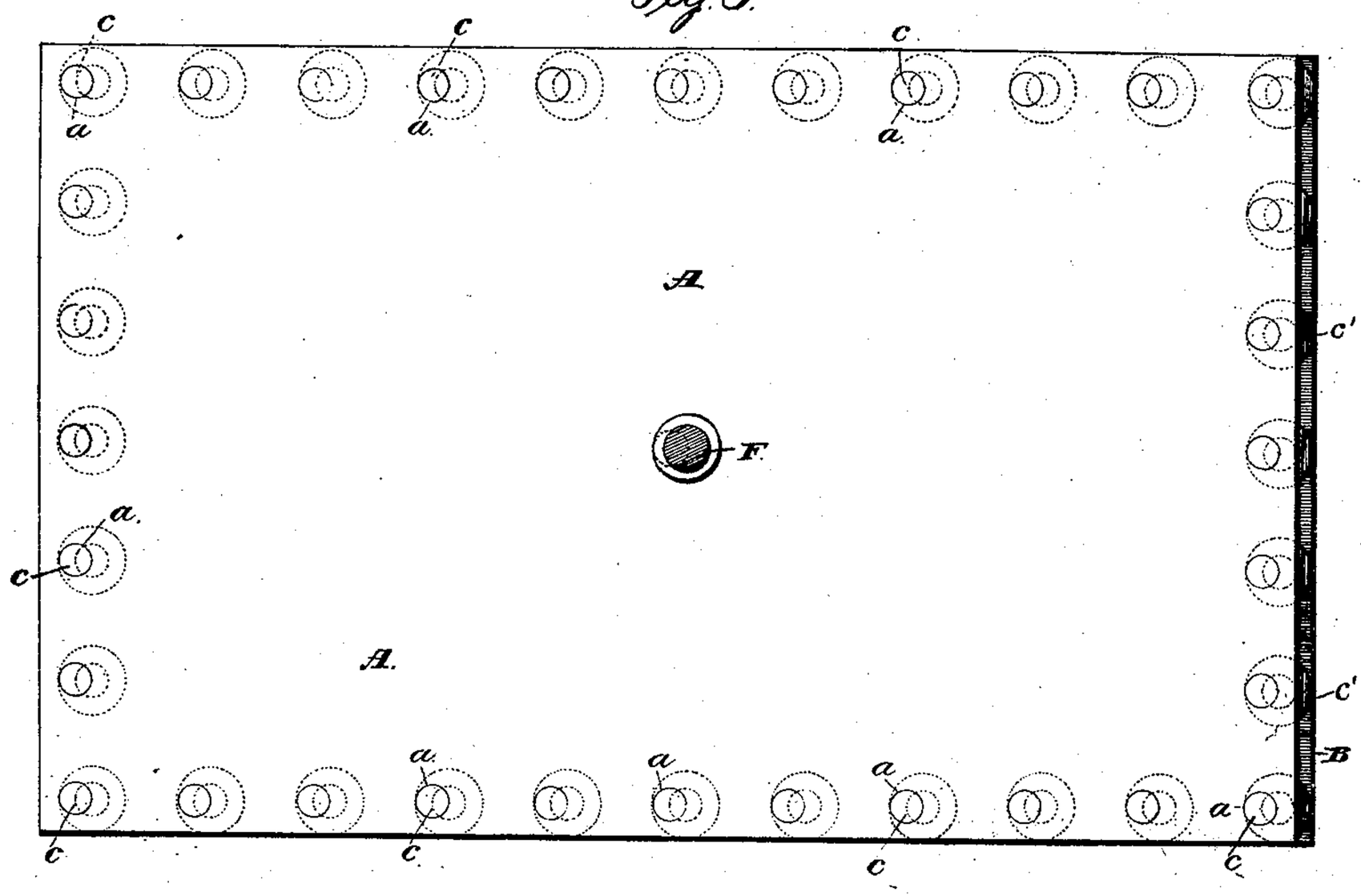
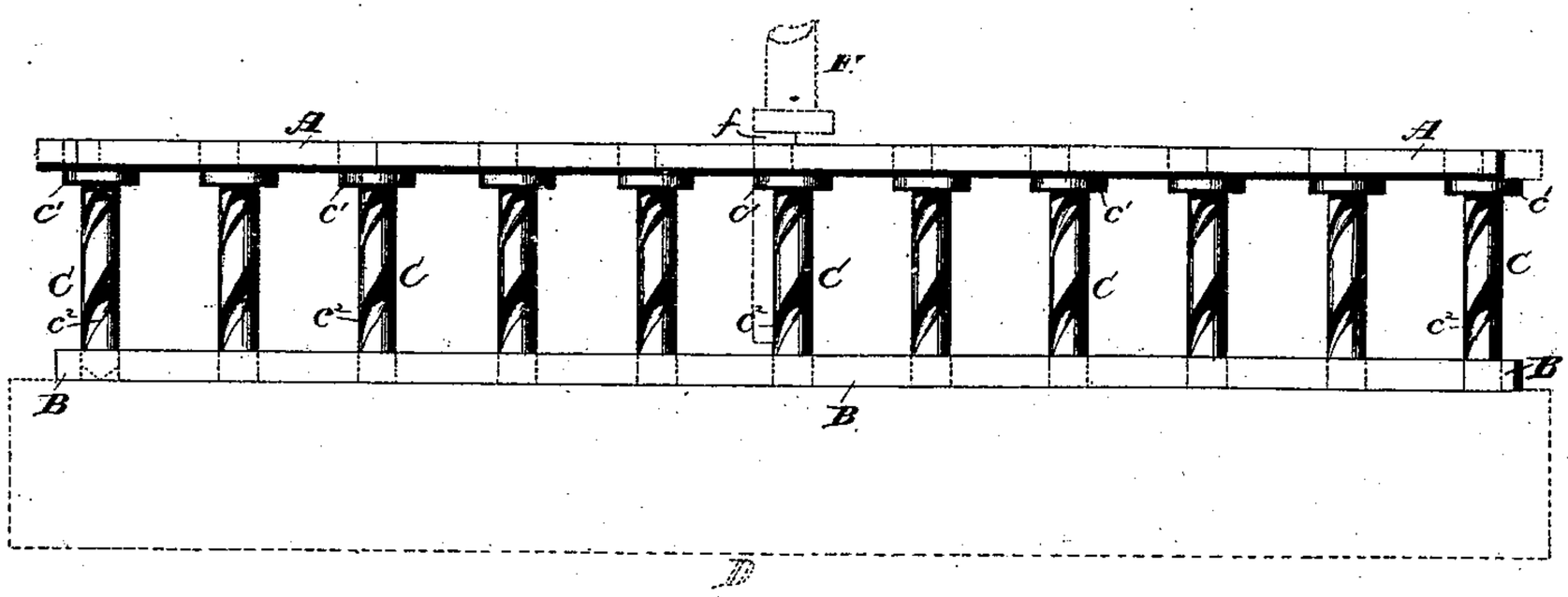


Fig. 4.



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MECHANISM FOR DRILLING.

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Fig. 5.

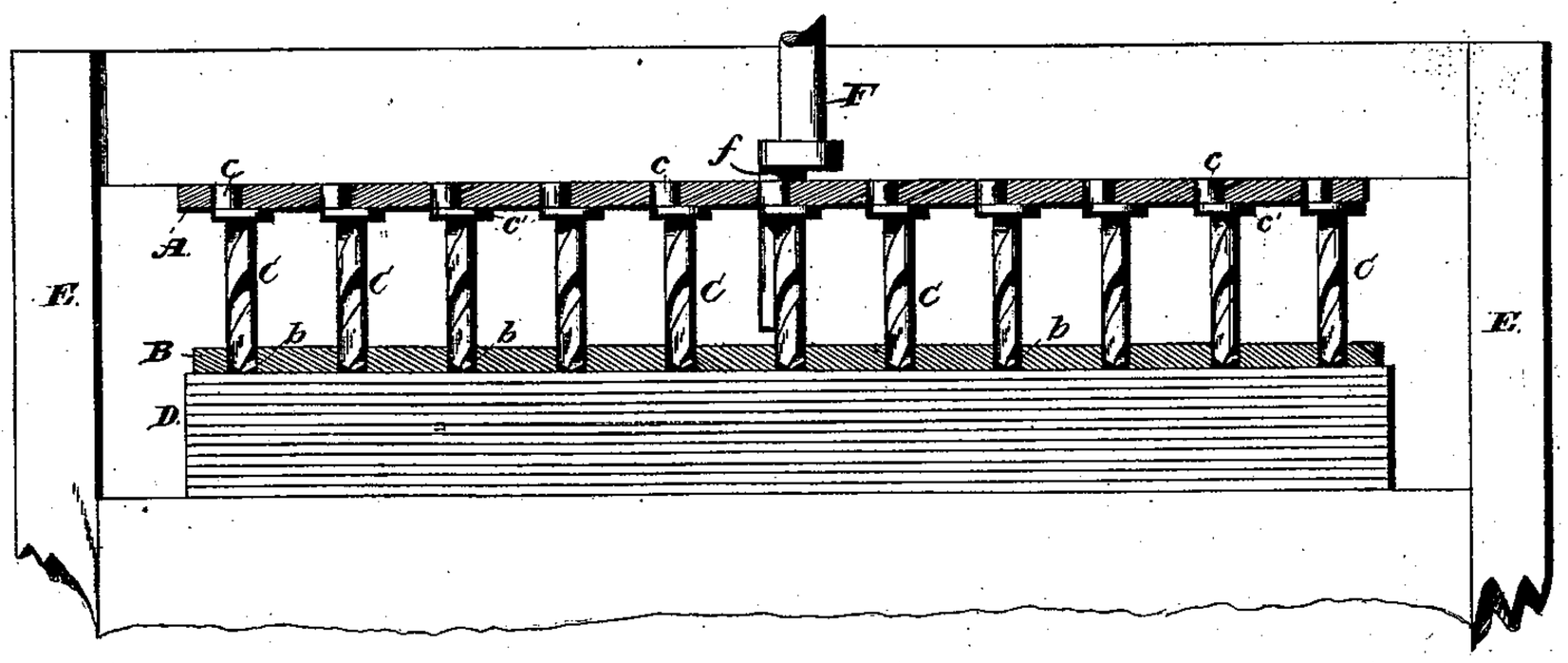
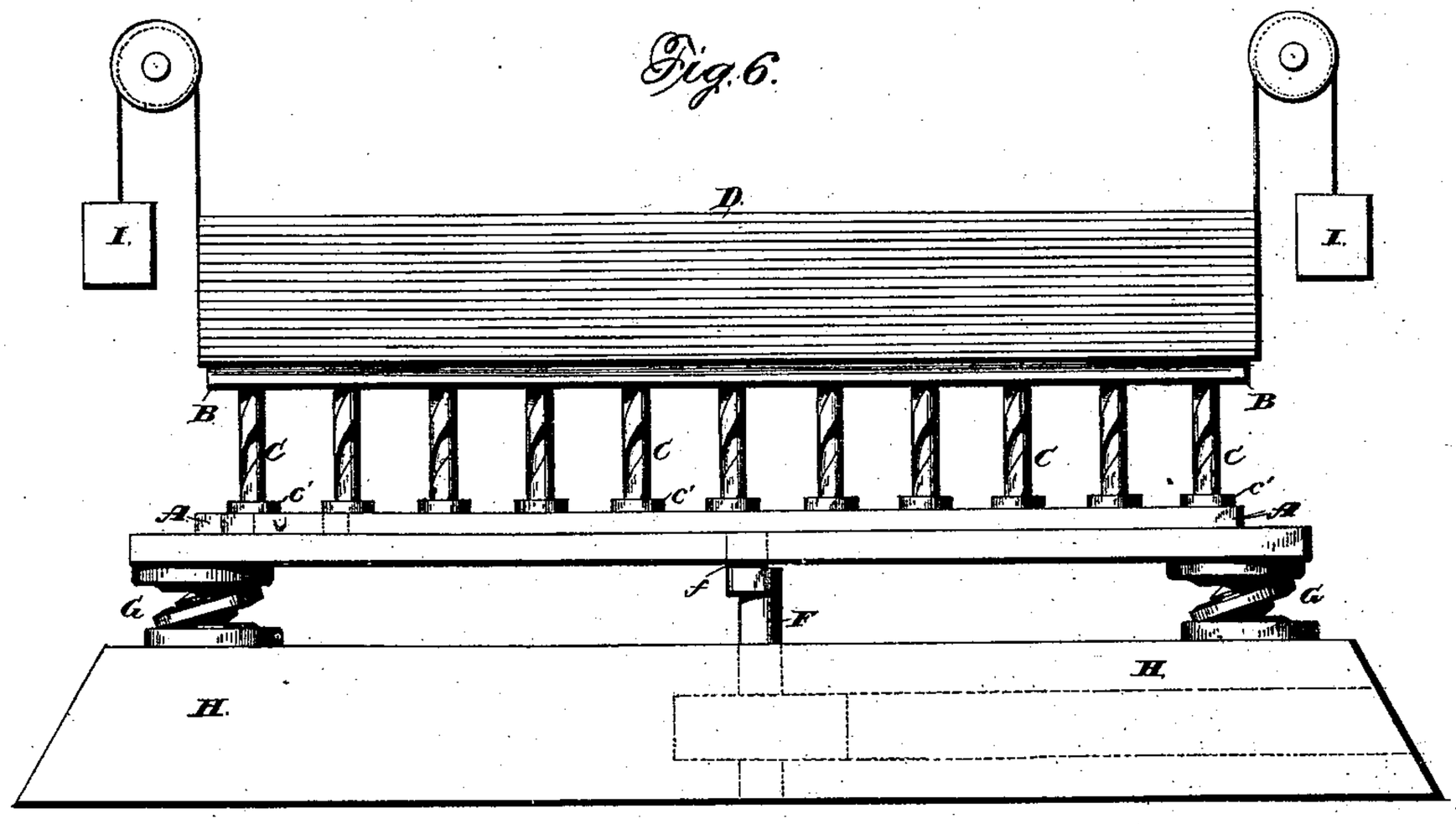


Fig. 6.



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E. B. COXE & S. SALMON.

MECHANISM FOR DRILLING.

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Fig. 7.

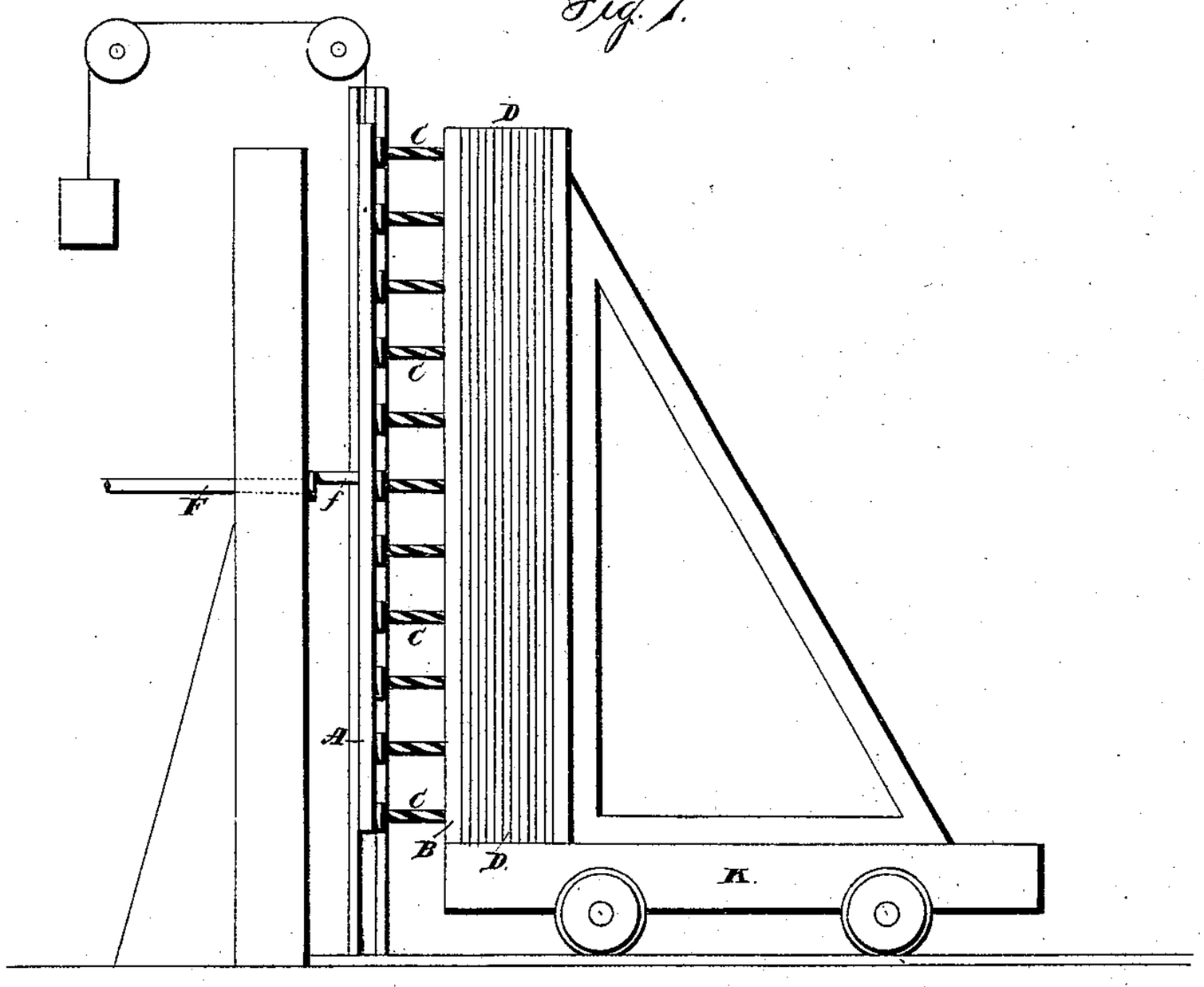


Fig. 8.

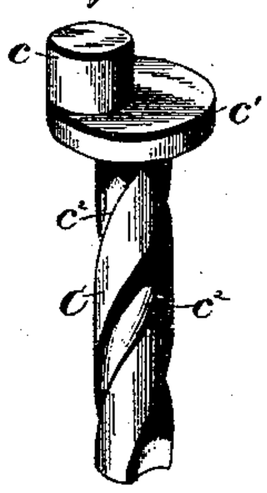


Fig. 9.

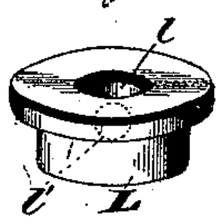


Fig. 10.

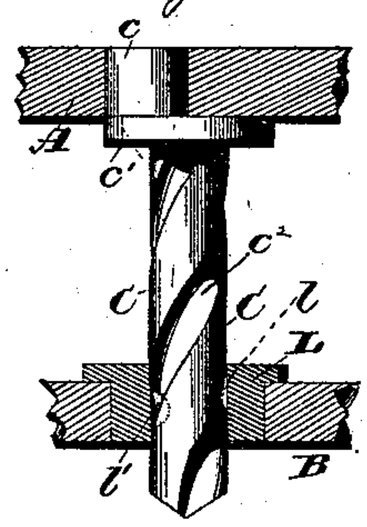


Fig. 11

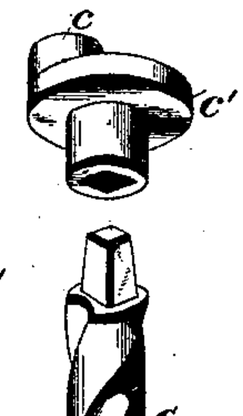
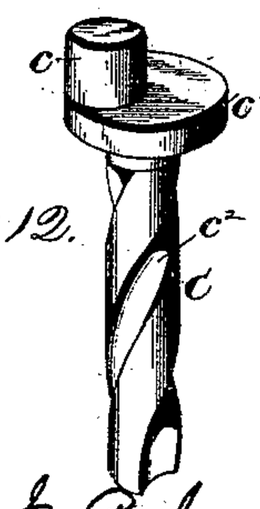


Fig. 12.



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UNITED STATES PATENT-OFFICE.

ECKLEY B. COXE AND SAMUEL SALMON, OF DRIFTON, PENNSYLVANIA;
SAID SALMON ASSIGNOR TO SAID COXE.

MECHANISM FOR DRILLING.

SPECIFICATION forming part of Letters Patent No. 483,903, dated October 4, 1892.

Application filed April 4, 1888. Renewed May 2, 1889. Serial No. 309,414. (No model.)

To all whom it may concern:

Be it known that we, ECKLEY B. COXE and SAMUEL SALMON, of Drifton, in the county of Luzerne, and in the State of Pennsylvania, have invented certain new and useful Improvements in Mechanism for Drilling; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of one form of our mechanism from the upper or crank side. Fig. 2 is a like view of the same from the lower or drill side. Fig. 3 is a plan view of said mechanism from the crank side. Fig. 4 is a side elevation of the same, the full lines showing one position of the oscillating plate and the dotted lines the opposite position of the same. Fig. 5 is a vertical section of said mechanism, with its supporting frame, when in operation. Fig. 6 is a side elevation of a form of mechanism in which the work is placed above the drills and moved downward into engagement with the same. Fig. 7 is a like view of said mechanism when arranged for operation upon a vertical face. Fig. 8 is an enlarged perspective view of one of the crank-drills separated from the oscillating and guide plates. Fig. 9 is a like view of a guide-sleeve for use with a drill. Fig. 10 is an enlarged central longitudinal section of said drill and sleeve as combined and in position for use. Fig. 11 is a perspective view of a drill and crank made separate from each other, and Fig. 12 is a like view of the same combined for use.

Letters of like name and kind refer to like parts in each of the figures.

Our invention is designed to facilitate the simultaneous drilling of a number of holes within plates or other parts of mechanisms which require to be duplicated; and to such end our invention consists principally in the means employed for simultaneously rotating a number of drills, which are arranged with their axes in parallel lines, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for journaling a number of drills having parallel axes, substantially as and for the purpose hereinafter shown.

It consists, finally, in details of construction, substantially as and for the purpose hereinafter set forth.

In the carrying of our invention into practice two metal plates A and B, having the desired size and shape, are placed together, and through the same are drilled holes *a a* and *b b*, respectively, which correspond in number and location and preferably in size to the holes that are to be drilled in a piece of work. In the drawings said plates are shown as prepared for use in connection with a boiler-plate which has a row of holes along each edge to adapt it to be riveted to or upon the edge of a connecting-plate. Within each of the holes *b* and *b* is placed a twist-drill C, that loosely fills the same, and upon its upper end is provided with an eccentrically-located journal *c*, which has substantially the same diameter as and is arranged with its axis parallel with the axis of said drill, the relative arrangement of said parts constituting as a whole a crank. The journals *c* and *c* of the crank-drills C and C are now given the same relative positions, and over them is placed the plate A, each of the holes *a* and *a* being caused to engage with and contain one of said journals, and the weight of said plate being supported upon the enlargement *c'*, which forms the connection between said journals and the drills. If, now, said plate A is moved horizontally in the direction necessary to rotate one of the cranks, each of the drills will be simultaneously rotated in the same direction and with precisely the same velocity.

In practice the plate B, which operates as a templet, is placed upon and secured to the part to be drilled, shown in the drawings as a number of boiler-plates D and D, the drills C and C and plate A placed in position, and the whole then moved beneath a frame E, within which is journaled a vertical shaft F, that upon its lower end is provided with a crank *f*, which is adapted to engage with said plate A. Said crank *f* has precisely the same throw as have the drill-cranks, so that when said shaft is set in motion said plate A will

be caused to oscillate in a horizontal plane and said drills C and C to be rotated. As the drills are rotated their lower operative ends will be caused to cut into the plates D and D in the usual manner, the weight of the plate A being usually sufficient to give the required downward pressure. Should, however, greater pressure be necessary, it may be supplied by placing weights upon said plate A or by any of the means commonly employed for such purposes in connection with drill-presses. The crank *f* has such length as to enable it to keep in engagement with the plate A during the downward movement of the latter as the drilling progresses.

In Fig. 6 is shown an arrangement of parts in which the work is placed above the drills and is moved down upon the same. In such construction the plate A is supported upon four double-cone rollers G and G, which rollers are placed between the upper side of the bed-plate H and the lower side of said plate A and furnish rolling bearings for the latter. Said rollers have such proportions as to permit said plate A to have a circular horizontal motion which exactly corresponds to the throw of the drill-cranks. A vertically-journaled shaft F, having upon its upper end a crank *f*, operates to oscillate said plate A, as in the arrangement before described. The plates to be drilled are placed upon the templet B and by gravity move downward as the drills cut away the metal. Where the weights of said plates and templet are in excess of the requirements for feeding the work downward, any desired portion of such weight may be neutralized by means of two or more counter-weights I and I, as shown.

In Fig. 7 is shown a construction of mechanism by which the drills may be caused to operate upon a vertical face. In such construction the operative plate A is counterbalanced and arranged to move within guides that permit of free motion in the plane of its oscillation, while operating to prevent said plate from leaving such plane. The templet B, together with the plates to be drilled, is placed vertically upon a truck or slide K and the whole then moved toward or from the operative plate A, as required. Motion is given to the latter by means of a shaft F, that is provided with a crank *f*, as in the construction before described. As the body of each drill C is cylindrical and of uniform diameter and the clearance-grooves c^2 and c^2 lessen but little its bearing-surface, said drill will run in its opening *b* in the templet B for a long time without appreciable wear; but for the purpose of reducing such wear to a minimum in some instances the said templet-openings are made larger than said drill, and within each opening is journaled a sleeve or bushing L, that is adapted to revolve freely therein, but is prevented from longitudinal displacement by any of the means usually employed for such purpose. Interiorly said bushing has such size as to adapt it to receive a drill and to permit the same to move easily therein, and within its axial opening *l* is provided with a stud *l'*, that projects radially inward and engages with one of the clearance-grooves *c'*, and thereby locks said bushing and drill together circumferentially, so as to compel the former to rotate with the latter, while permitting of the free longitudinal movement of said drill through said bushing. If desired, the bushing may have a plain round interior, so as to permit the drill to rotate independently within the same. As thus arranged the entire wear caused by the rotation of a drill is between the periphery of the bushing and the sides of the opening in the templet in which it is journaled, so that by hardening such surfaces perfect accuracy and great durablility can be secured.

It is intended that the drills and their cranks shall be integral, as shown, but, if desired, each drill may be separate and provided at its upper end with a tapering shank, and the lower portion of each crank, like the socket end of an ordinary drill-spindle, may be adapted to receive and contain such shank, as shown in Figs. 11 and 12.

We are aware that heretofore drills have been journaled with parallel axes within two supporting-plates and simultaneously rotated by means of crank-disks, which were engaged by pins upon a third oscillating plate, and do not claim such mechanism.

Having thus described our invention, what we claim is—

1. As an improvement in drilling mechanism, in combination, a series of vertically-journaled and vertically-movable cranked drills, a crank-plate engaging the drill-cranks and adapted to move downward of its gravity and carry with it said drills and so feed the same to their work, and suitable means for oscillating said plate, substantially as and for the purpose set forth.

2. As an improvement in drilling mechanism, in combination, a series of drills cranked at their upper ends and having enlargements thereat, a crank-plate resting upon the latter and of its gravity adapted to move downward and carry with it said drills, and the drill journaling and guiding plate adapted to be secured to the work to be drilled and being a duplicate of said crank-plate in respect to openings and their relative location, substantially as and for the purpose shown and described.

3. As an improvement in drilling mechanisms, in combination with a drill and with a templet which is provided with a drill-opening, a bushing or thimble that is journaled within such opening and is adapted to receive such drill and permit it to pass longitudinally through the same, substantially as and for the purpose shown.

4. As an improvement in drilling mechanisms, in combination with a drill and with a

templet which is provided with a drill-opening, a bushing or thimble that is journaled within such drill-opening and is adapted to receive such drill and permit it to pass through the same in the line of the clearance-grooves, substantially as and for the purpose set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 31st day of March, A. D. 1888.

ECKLEY B. COXE.
SAMUEL SALMON.

Witnesses:
HARRY J. DAVIS,
ELLIOTT A. OBERRENDER.