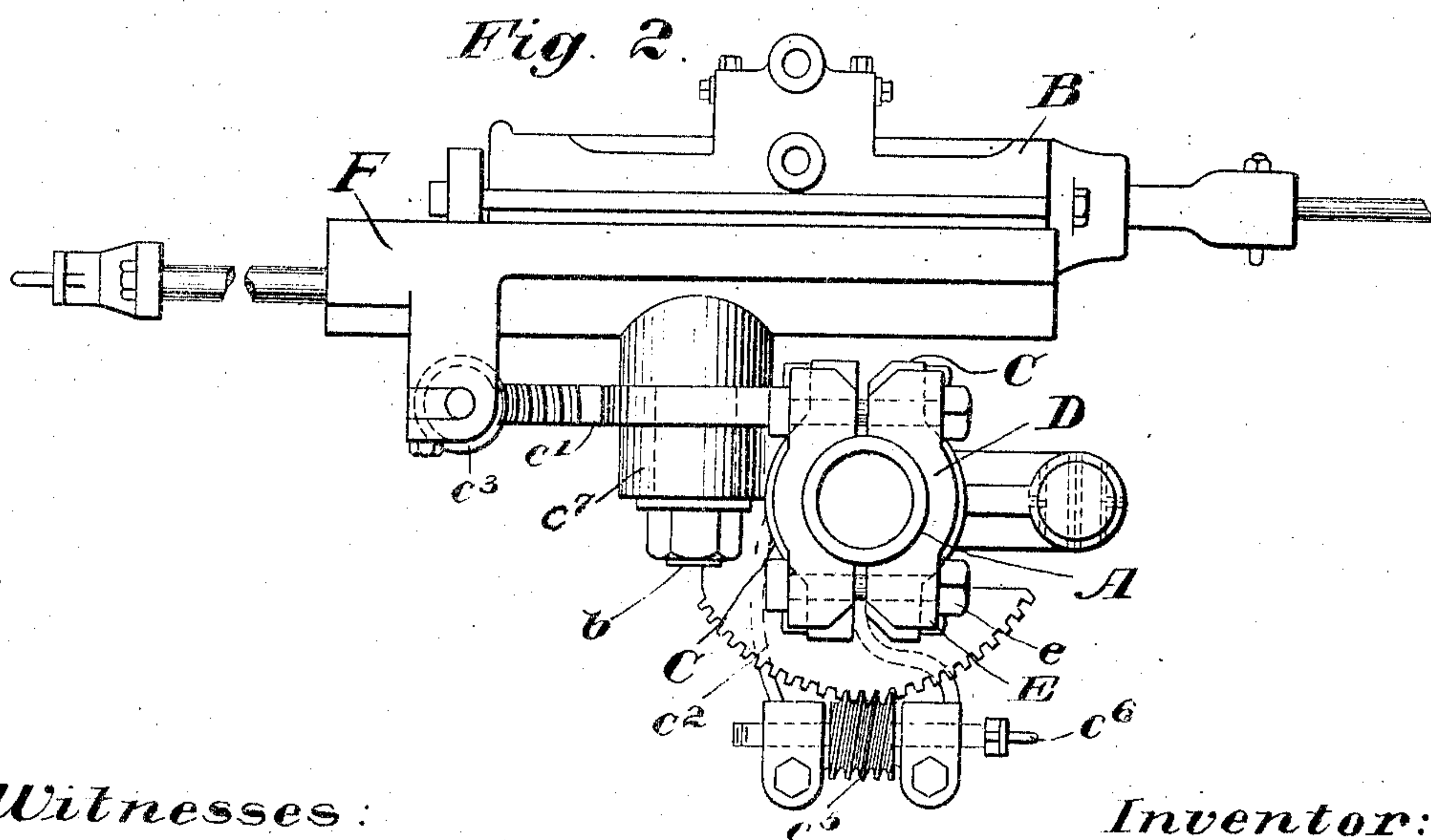
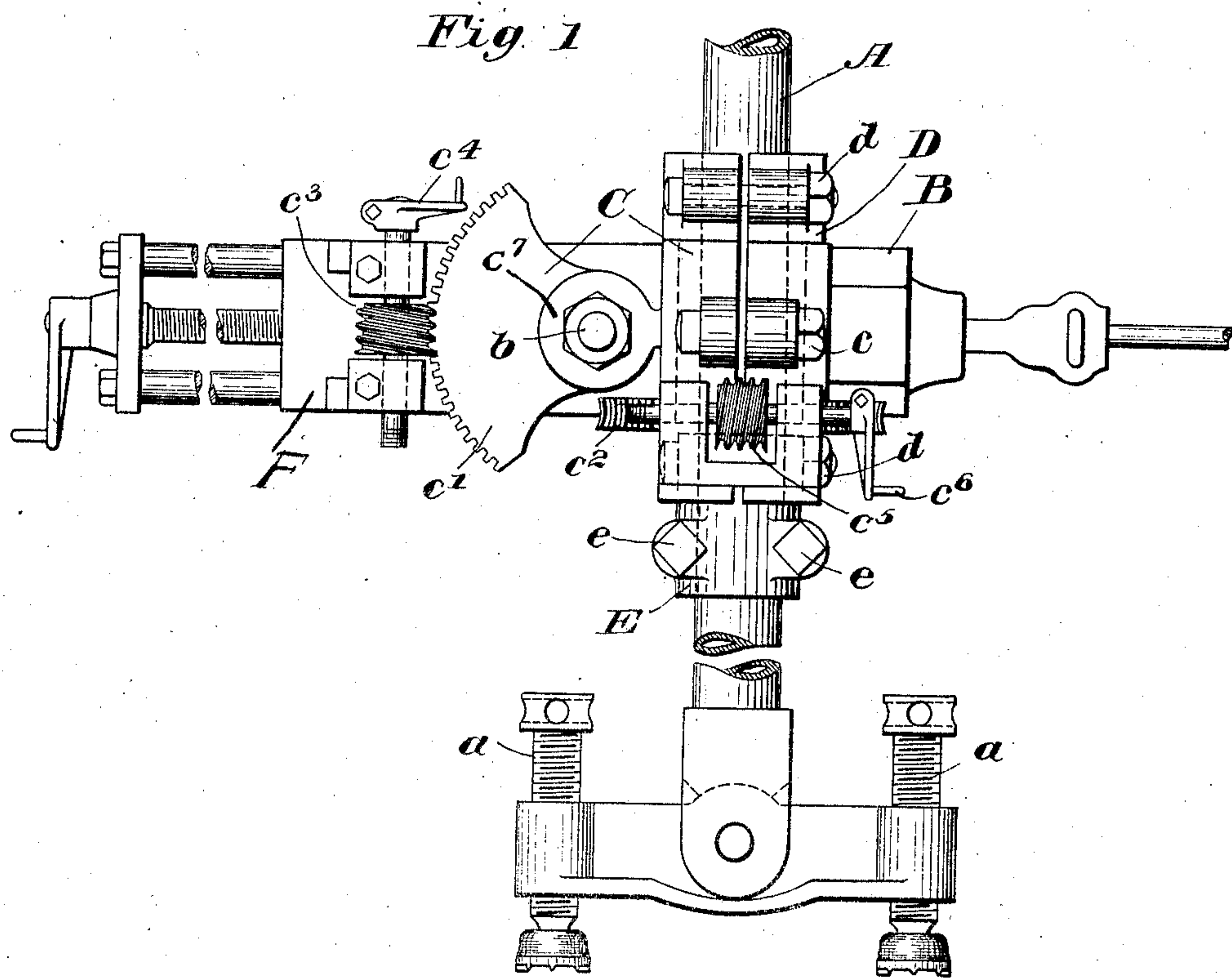


905,490.

Patented Dec. 1, 1908.

2 SHEETS—SHEET 1.



Witnesses:
Horace A. Crossman
Everett J. Emery.

Inventor:
Albert Ball.
by Emery, Booth & Powell
Attys

A. BALL.
COAL OR ROCK DRILLING MACHINE.
APPLICATION FILED JAN. 14, 1904.

905,490.

Patented Dec. 1, 1908.

2 SHEETS—SHEET 2.

Fig. 3.

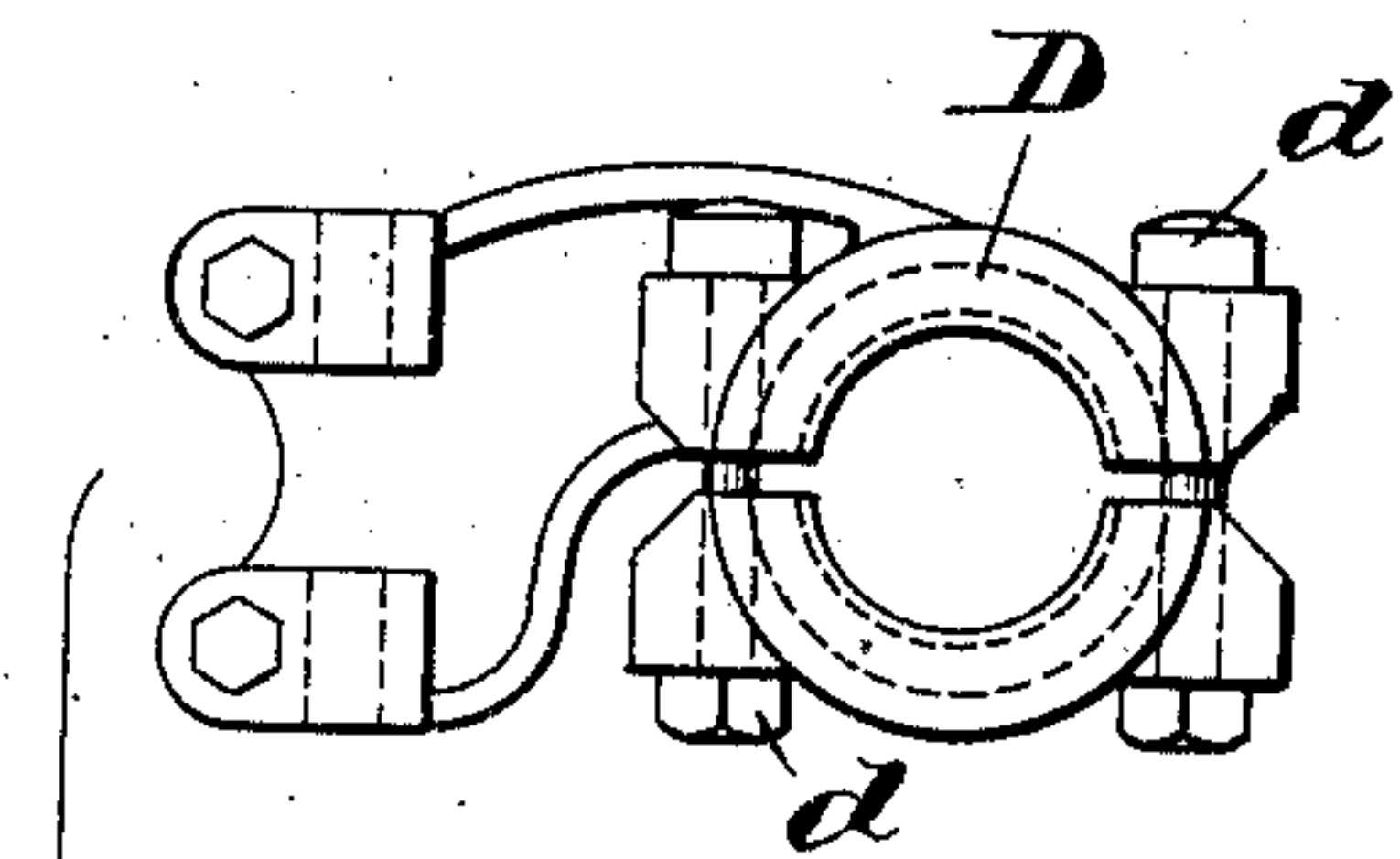
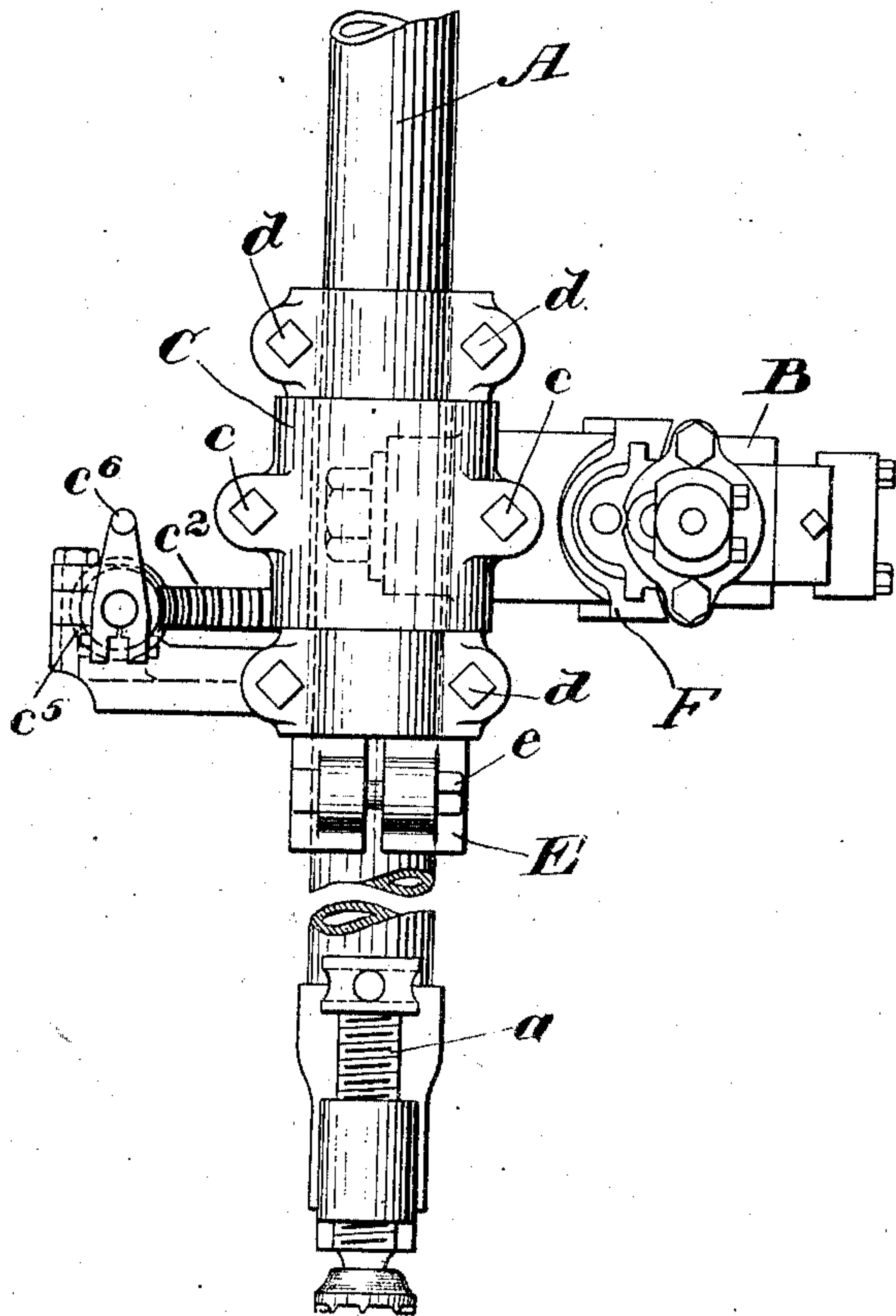


Fig. 4.

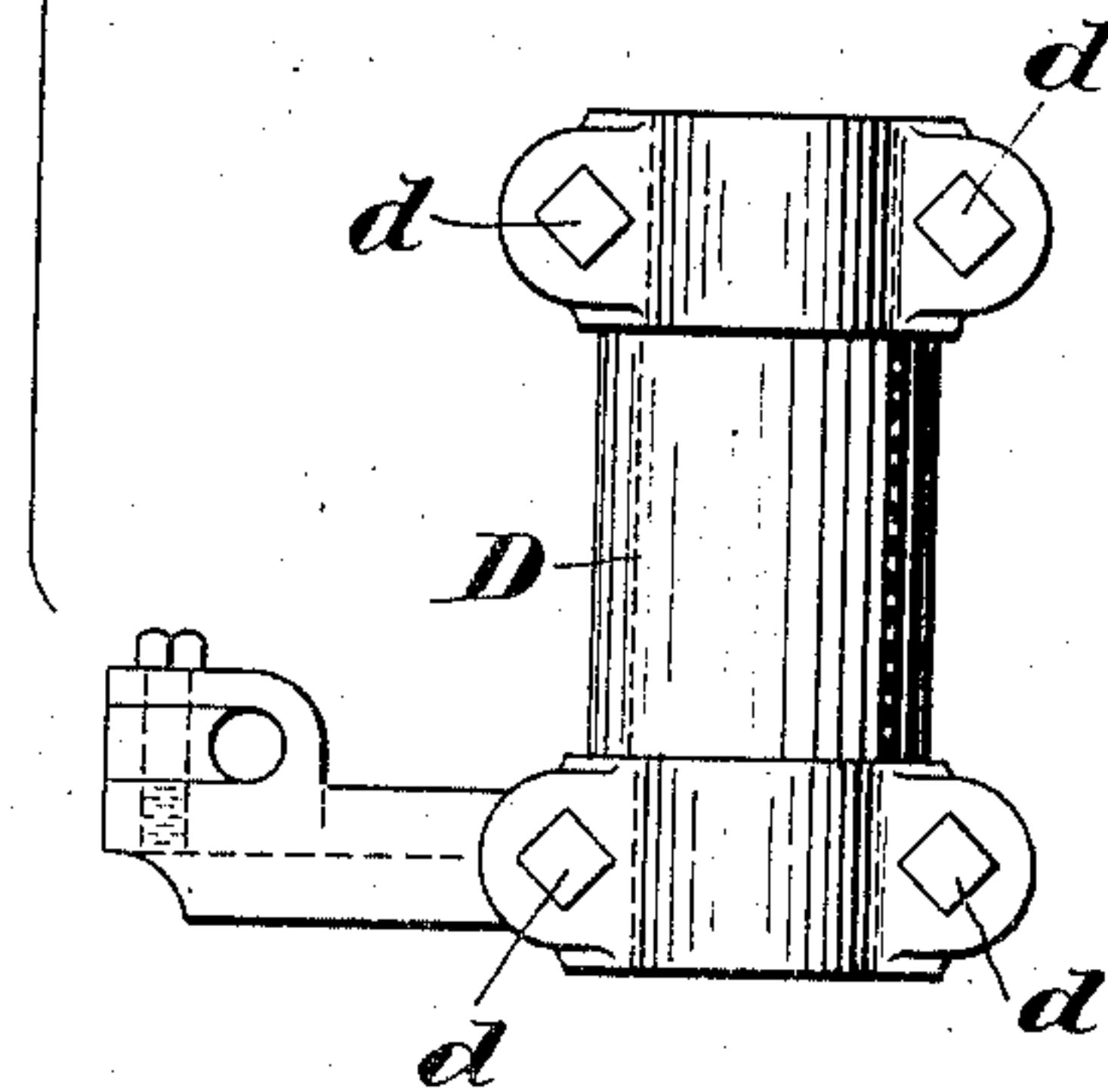
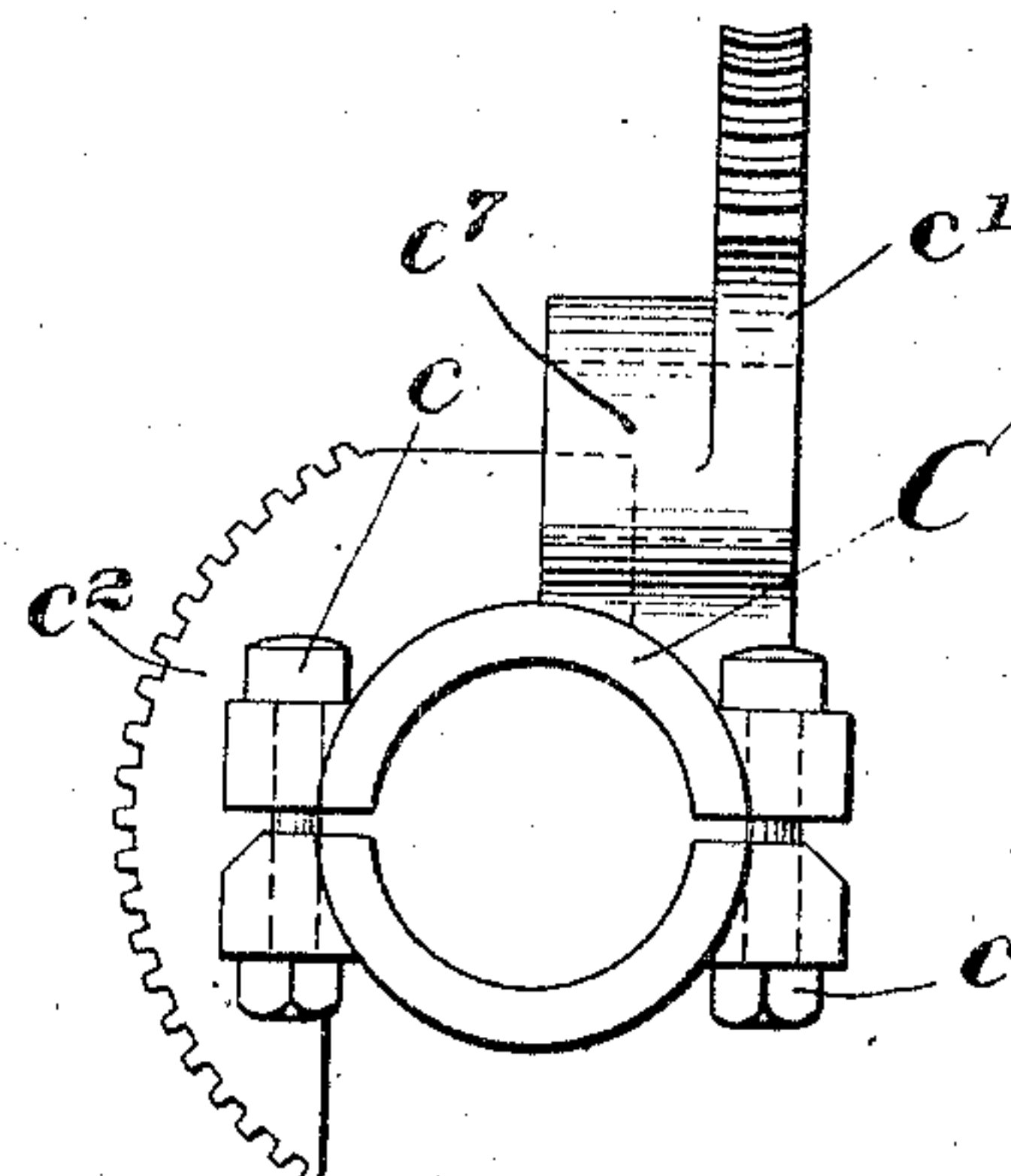
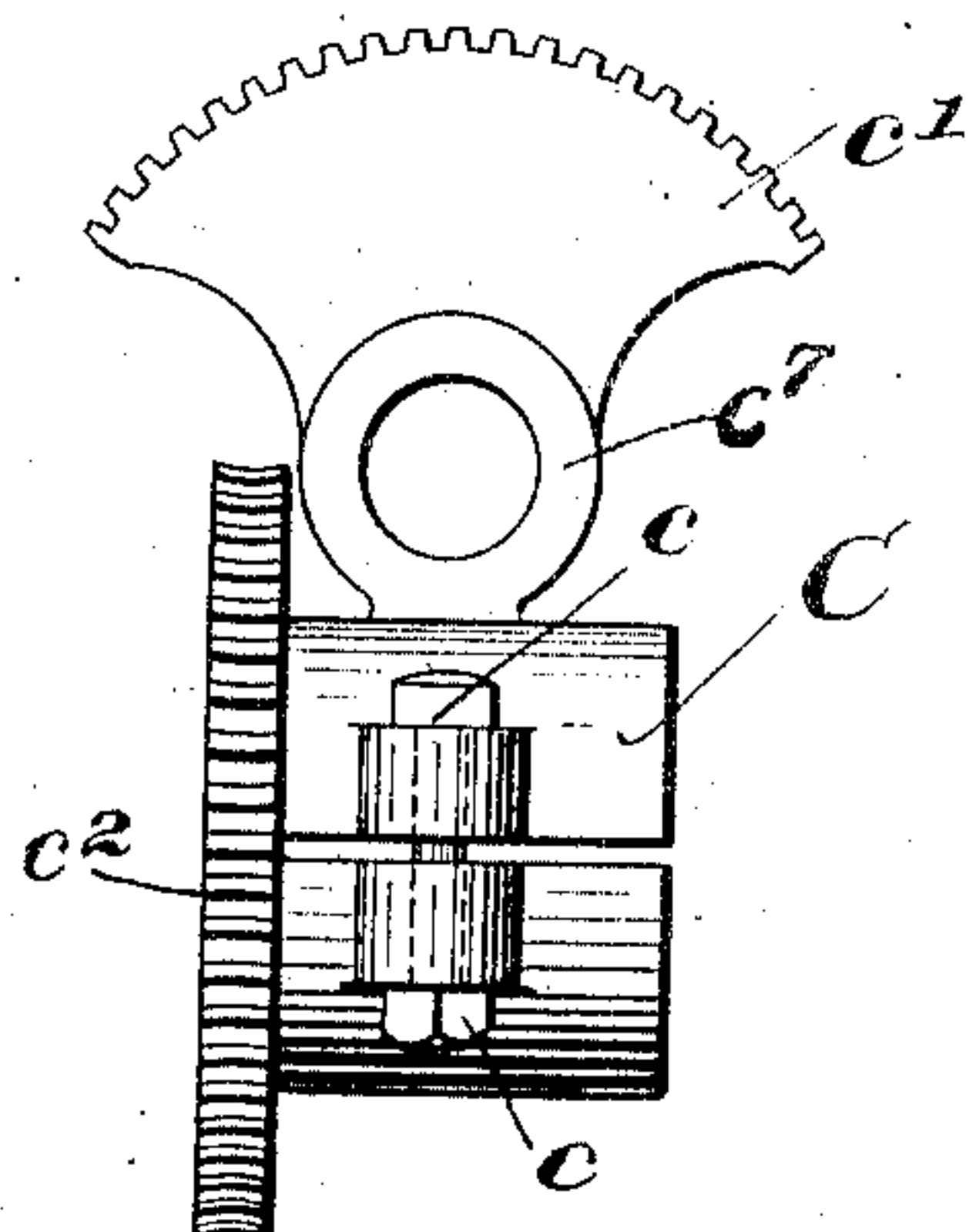


Fig. 5.



Witnesses:
Horace A. Crossman.
Ernest L. Emery.

Inventor:
Albert Ball
by Emery, Booth Powell
Attys.

UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO SULLIVAN MACHINERY COMPANY, OF CLAREMONT, NEW HAMPSHIRE, A CORPORATION OF MAINE.

COAL OR ROCK DRILLING MACHINE.

No. 905,490.

Specification of Letters Patent.

Patented Dec. 1, 1908.

Application filed January 14, 1904. Serial No. 188,964.

To all whom it may concern:

Be it known that I, ALBERT BALL, a citizen of the United States, and a resident of Claremont, in the county of Sullivan and State of New Hampshire, have invented an Improvement in Coal or Rock Drilling Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention aims to provide an improved coal or rock drilling machine whereby it may easily be caused to operate in and along different planes, as for instance, for shearing and under-cutting.

The nature of my invention will best be understood from a description of one embodiment thereof, it being understood, however, that my invention is not limited to the particular embodiment selected for illustration.

In the drawings; Figure 1, in side elevation illustrates a machine, made in accordance with my invention; Fig. 2, is a top view of Fig. 1; Fig. 3, is a right-hand side view of Fig. 1; Fig. 4, details of the trunnion clamp which carries the drilling machine; and Fig. 5, details of the double quadrant and the carrier for the same.

In the machine shown in the drawings, the column upon which the machine is mounted is shown at A, it being provided, for instance, at its lower end with suitably arranged jack screws or devices, *a*, for wedging the column end-wise in position, as between the top and bottom of a mine drift.

The coal or stone drilling machine indicated is typified at B, and may be of any suitable or desired type or construction. It is provided with a usual form of drill shell or cradle F, the latter having at one side a hub or arm *b*, which turns in a socket or bearing *c'* formed in the saddle or collar C. The latter serves as a shell support and is in the form of a sleeve mounted to turn about a trunnion embodied in the clamp or quill D, which in turn is mounted upon the column A.

The shell-supporting saddle or collar C, is made in separable parts, which may be clamped together, as by bolts *e*, about and upon the inclosed trunnion clamp D; and the latter in turn is made in separable parts

adapted to be clamped by bolts, *d*, upon the supporting column. Immediately below the trunnion clamp D may be placed a supporting collar E made in separable parts and provided with means, as the bolts *e*, for clamping it upon the column.

The shell-supporting saddle or collar C (see Fig. 5) is provided with two toothed quadrants, *c'* *c''*. The quadrant *c'* meshes with the worm *c''* on the machine carriage the handle *c''* being provided for operating it. And the quadrant *c''*, (see Figs. 2 and 3) meshes with the worm *c'*, mounted in an arm on the trunnion clamp D, a handle *c'* being provided for operating it.

Assuming the trunnion clamp D to be clamped against rotation upon the column A, it is clear that rotation of the worm *c''*, (Fig. 1), will cause the drilling machine to be swept about its hub *b* as a pivot through a vertical plane, or plane parallel with the column A, for vertical or shear cutting. On the other hand if the worm *c'* be rotated, it will cause the entire shell-supporting saddle or collar together with the drilling machine to be swept horizontally about the axis of the column for horizontal or under-cutting. And in either case the worm which is not in use for sweeping the drilling machine serves as a means for maintaining fixed, or against deviation, the plane in and along which the cutting movement is taking place.

The trunnion clamp D preferably will be clamped against rotation upon the column, relying upon the worm *c'* to produce rotative movement of the cut drilling machine about the column. Obviously, however, when a movement is desired exceeding the possible or practicable movement by the worm *c'* and its quadrant, the entire trunnion clamp may be slackened and rotated upon the column, and again clamped, if desired, in its new position. The shell-supporting saddle or collar, it will be seen, carries both quadrants and, with the trunnion clamp and collar E, are adjustable vertically on the column A to obtain the correct position of the drill or tool.

It will be noticed that the axis of the pivot or hub *b* is offset from the axis of the column, thus enabling me to obtain as long a bearing for the hub as may be desired, while at the same time avoiding any material overhang

of the drill machine, thus giving the entire structure great stability.

Having described one embodiment of my invention, but without limiting my invention thereto, what I claim and desire to secure by Letters Patent is:—

1. The combination with a rock drilling machine of a supporting column therefor, a machine carrying saddle adjustable along said column and rotatable about the same, a plurality of quadrants on said saddle and a plurality of worms therefor respectively connected with said machine and said column for sweeping the machine in and along different planes.

2. The combination with a rock drilling machine of a support therefor, a plurality of connected quadrants adjustable along said support and rotatable about the same, and cooperating worms respectively connected with said support and said machine for sweeping the latter in and along different planes.

3. The combination with a rock drilling machine of a supporting column therefor, a quill adjustable along said column, a saddle loosely surrounding said quill and to which said machine is pivoted, quadrants on said saddle and engaging worms mounted respectively on said machine and on said quill.

4. The combination with a rock drilling machine of a supporting column therefor, a saddle rotatable about said column and to which said machine is pivoted, the axis of said pivot and the axis of said column being offset one from the other, and means for rotating said saddle about its supporting column and for swinging said machine relative to said saddle to produce cutting actions along different planes.

5. The combination with a rock drilling machine of a support therefor and a plurality of machine adjusting devices, adjustable along said support for adjusting said machine in and along different planes, said machine being controlled in one plane while undergoing adjustment in another plane.

6. The combination with a rock drilling machine of a supporting column therefor and a plurality of machine adjusting and controlling means, adjustable along said column, for controlling movement of said machine in and along different intersecting planes.

7. The combination with a rock drilling machine of a supporting column therefor and a plurality of machine adjusting devices, adjustable along said column, and constructed respectively to sweep said machine in and along different intersecting planes, said adjusting devices being in simultaneous engagement with said machine.

8. The combination with a rock drilling machine of a supporting column therefor, a collar loosely surrounding said column and

adjustable along the latter, and a plurality of machine adjusting devices cooperating with said collar and constructed respectively to sweep said machine in and along different intersecting planes, said devices remaining in constant control of said machine.

9. In a rock drill, in combination, a non-rotatable supporting column; a drill cradle carried by the column and having movements circumferential and parallel with the axis thereof, and independent crank and gear mechanism for communicating each of said movements to the cradle.

10. The combination with a rock drilling machine having an arm adapted to rotatably engage a socket, of a fixed support therefor; a clamp for engaging the support; a sleeve carried by the clamp and rotatably inclosing the support; a socket formed upon the sleeve; means for securing the drill within the socket; and independent means for controlling the rotation of the drill and of the sleeve.

11. In combination, a supporting column, a sleeve rotatably mounted on the column, a rock-drilling machine in swiveled engagement with the sleeve, means for rotating the sleeve about the column, and means independent of such rotating means for turning the rock drilling machine on its swivel.

12. The combination with a rock drilling machine of a supporting column therefor and a plurality of machine adjusting and controlling means, adjustable along said column, for controlling movement of said machine in and along planes circumferential and parallel with the axis of the supporting column.

13. The combination with a rock drilling machine a supporting column therefor and a plurality of machine adjusting devices, adjustable along said column, and constructed respectively to sweep said machine in and along planes circumferential and parallel with the axis of the supporting column; said adjusting devices being in simultaneous engagement with said machine.

14. The combination with a suitable support and a two-part trunnion arranged to be clamped to the support, of a shell-support provided with a two-part bearing arranged to embrace the said trunnion.

15. The combination with a suitable support and a trunnion arranged to be clamped to the support, of a shell-support provided with a bearing arranged to embrace the said support, and means for rotating the shell-support on the trunnion.

16. The combination with a supporting-column, of a trunnion removably secured to the column with its axis parallel with the axis of the column and a shell-support mounted in a plane transverse to the axis of the trunnion.

17. The combination with a suitable sup-

port and a trunnion adapted to embrace the support, of a shell-support arranged to embrace the trunnion, and means for rotating the shell-support on the trunnion about the axes of the support and trunnion.

18. The combination with a suitable support and a two-part trunnion arranged to be clamped to the support, of a shell-support provided with a two-part bearing arranged to embrace the said trunnion, and means for rotating the shell-support on the trunnion about the axes of the support and trunnion.

19. The combination with a rock drilling machine of a supporting column therefor, a machine-carrying saddle adjustable along said column and rotatable about the same, a plurality of quadrants on said saddle and a plurality of worms therefor respectively connected with said machine and said column for controlling the movement of the machine in and along planes circumferential and parallel with the axis of the supporting column.

20. The combination with a rock drilling machine of a supporting column therefor, a saddle rotatable about said column and to which the machine is pivoted, the axis of the said pivot and the axis of the said column being offset one from the other, and means for rotating said saddle about its supporting column and for swinging said machine relative to said saddle to produce cutting actions

in and along planes circumferential and parallel with the axis of the column.

21. The combination with a rock drilling machine of a supporting column therefor, a collar loosely surrounding said column and adjustable along the latter, and a plurality of machine adjusting devices cooperating with said collar and constructed respectively to sweep said machine in and along planes circumferential and parallel with the axis of the supporting column, said devices remaining in constant control of said machine.

22. The combination with a supporting column, of a trunnion adjustable along the column, means for securing the same in any selected position thereon, a shell support adapted to embrace the trunnion, a drill shell, means for securing the latter to the shell support, means for swinging the shell and shell support on the trunnion about the axes of the trunnion and column, and means permitting the swinging adjustment of the drill shell about an axis transverse to the axis of the column.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ALBERT BALL.

Witnesses:

FRANK A. BALL,
LEE A. KNIGHTS.