

(No Model.)

C. FULLER.
GRATE.

No. 604,143.

Patented May 17, 1898.

Fig. 1.

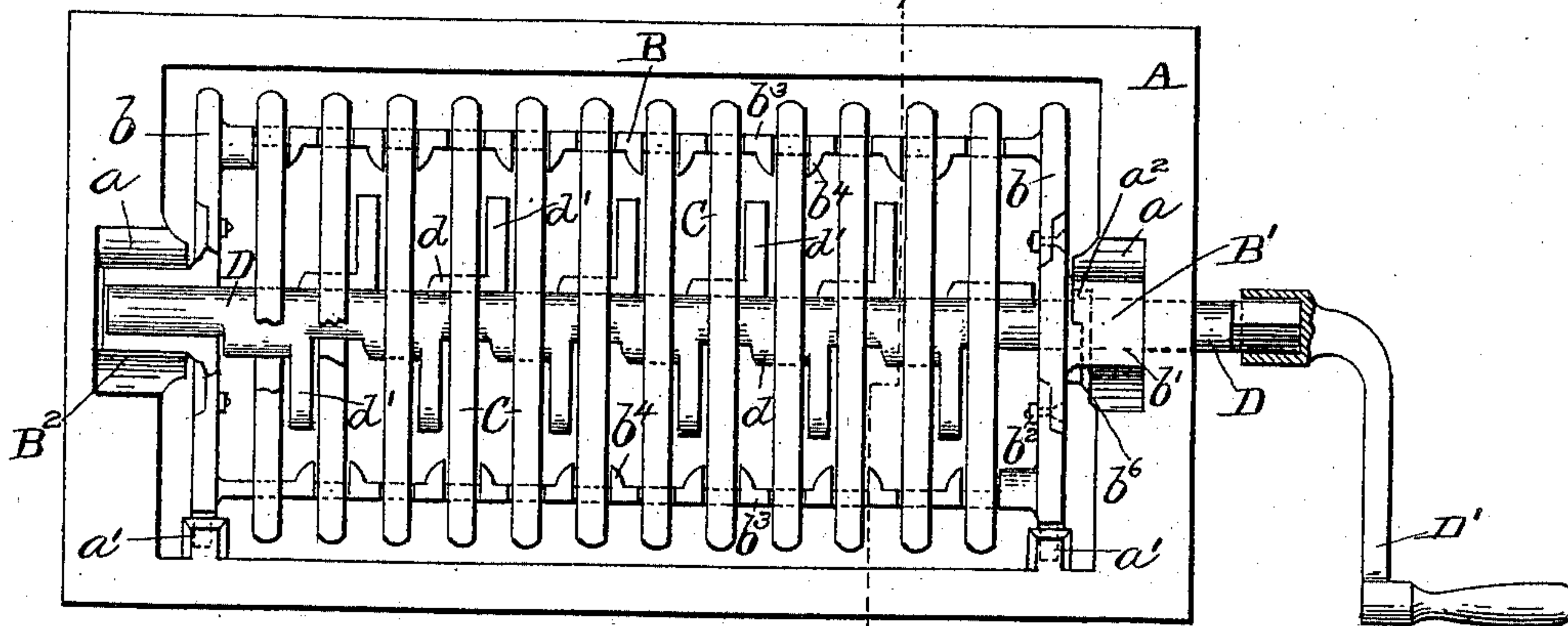


Fig. 2.

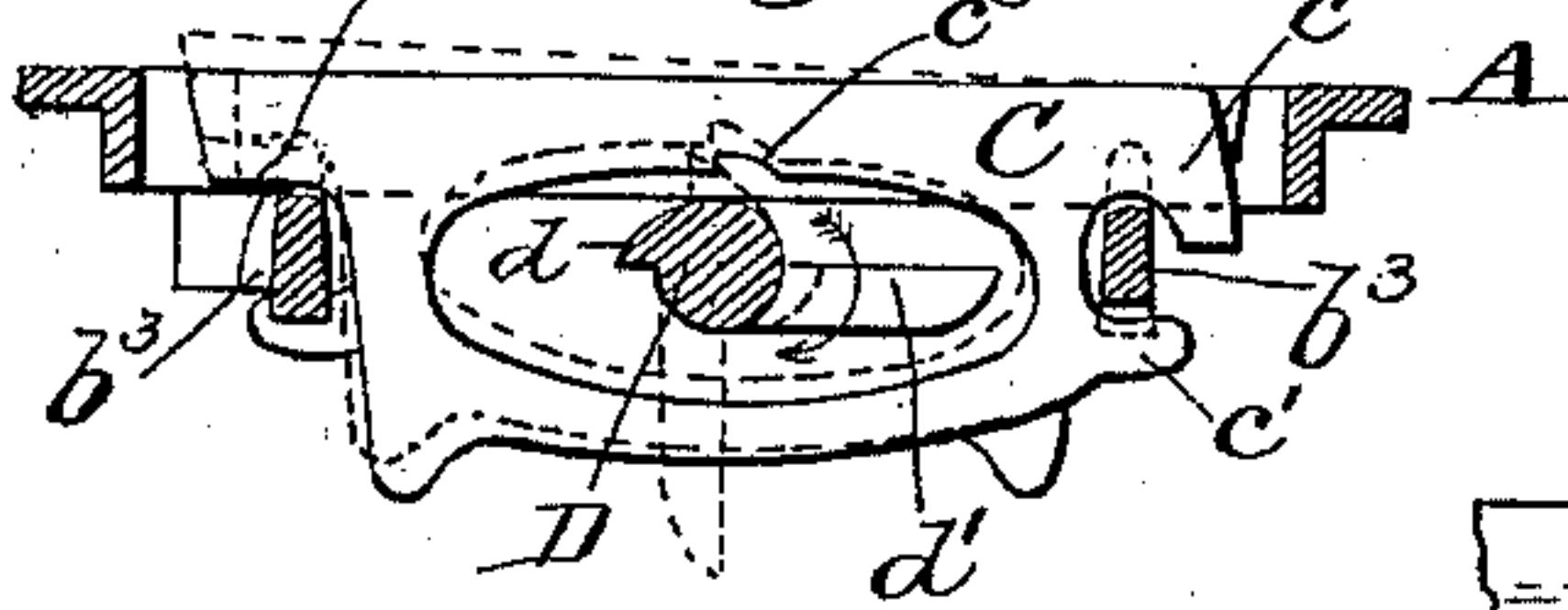


Fig. 3.

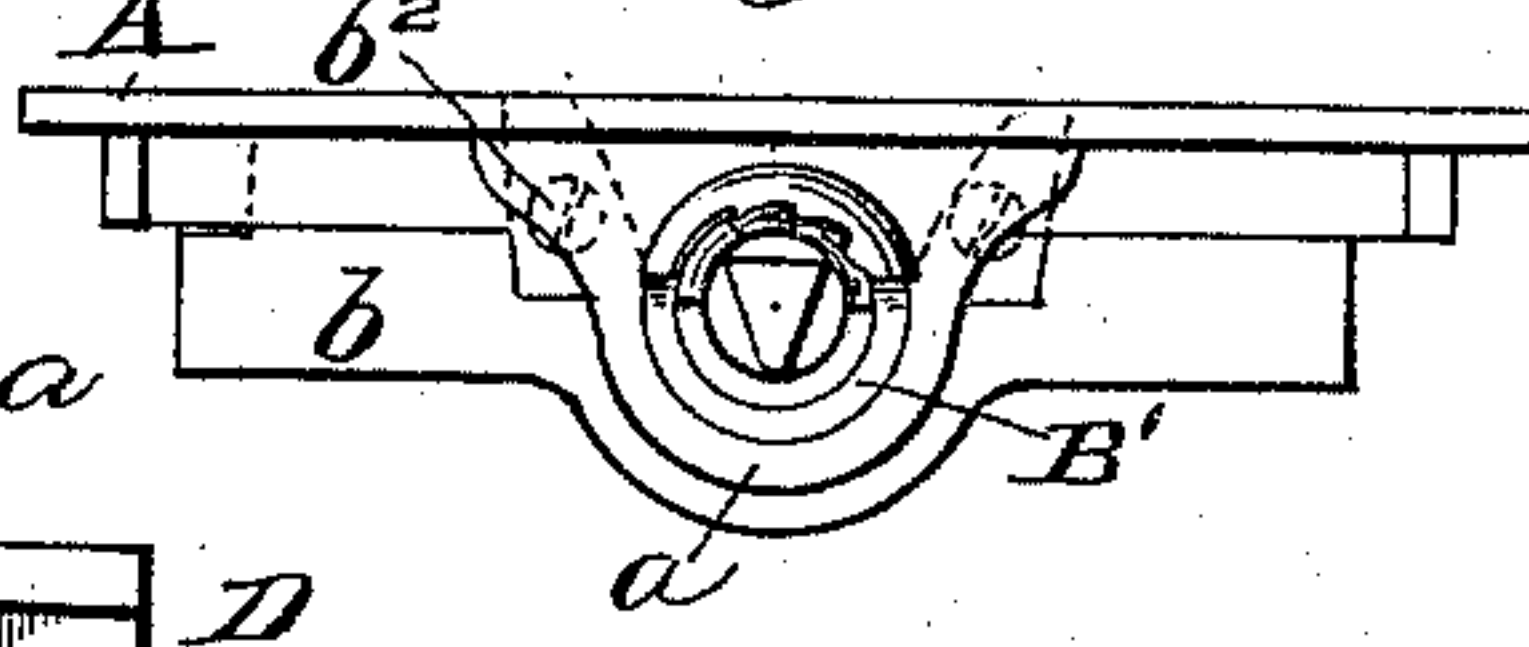


Fig. 8.

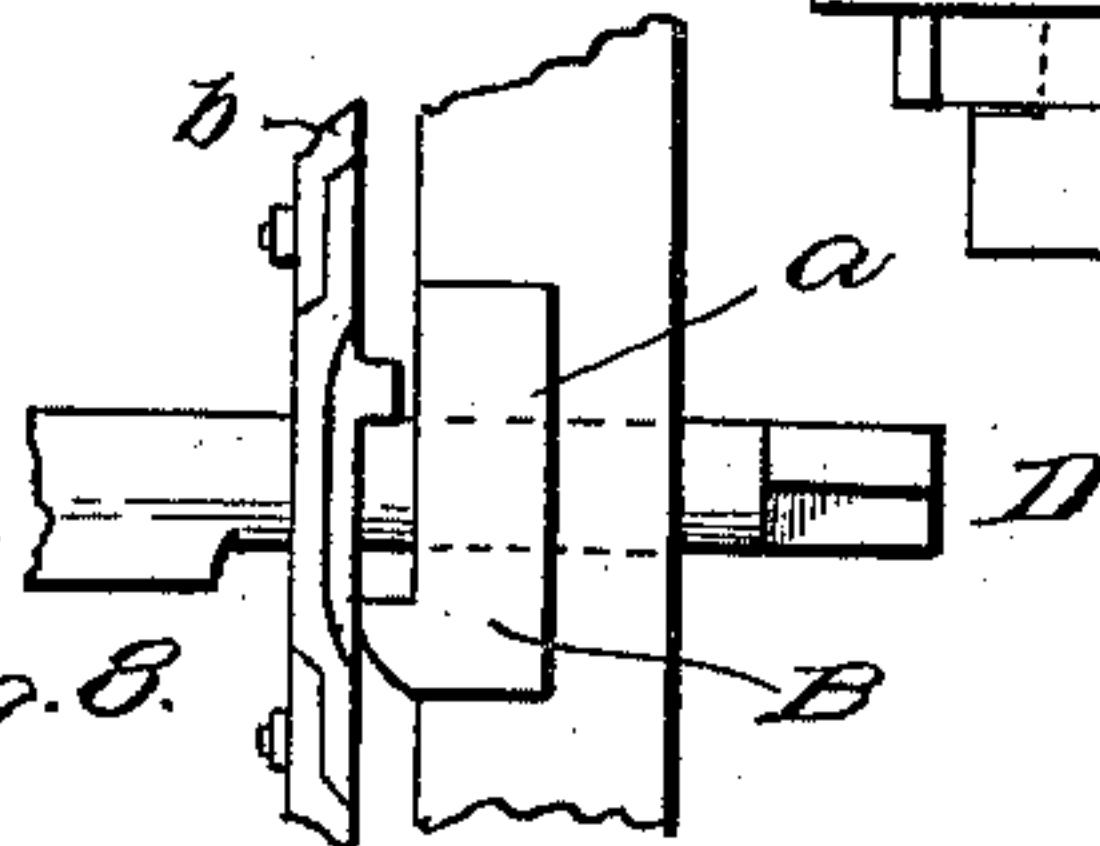


Fig. 4.

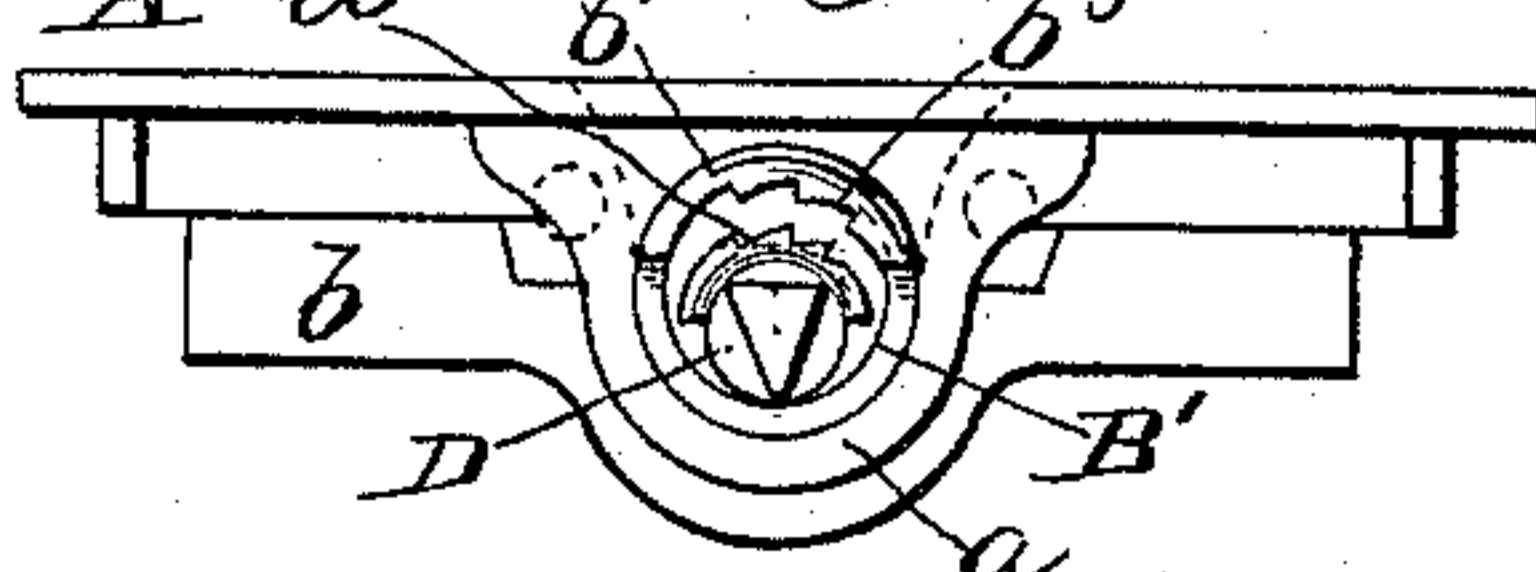


Fig. 6.

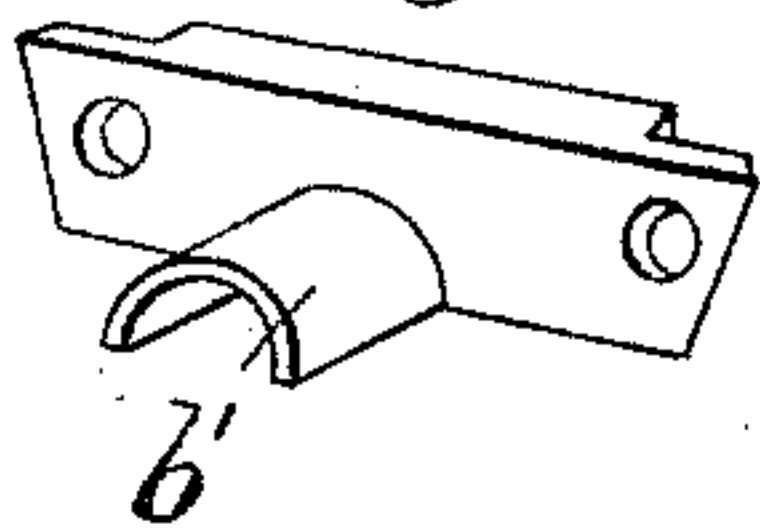


Fig. 5.

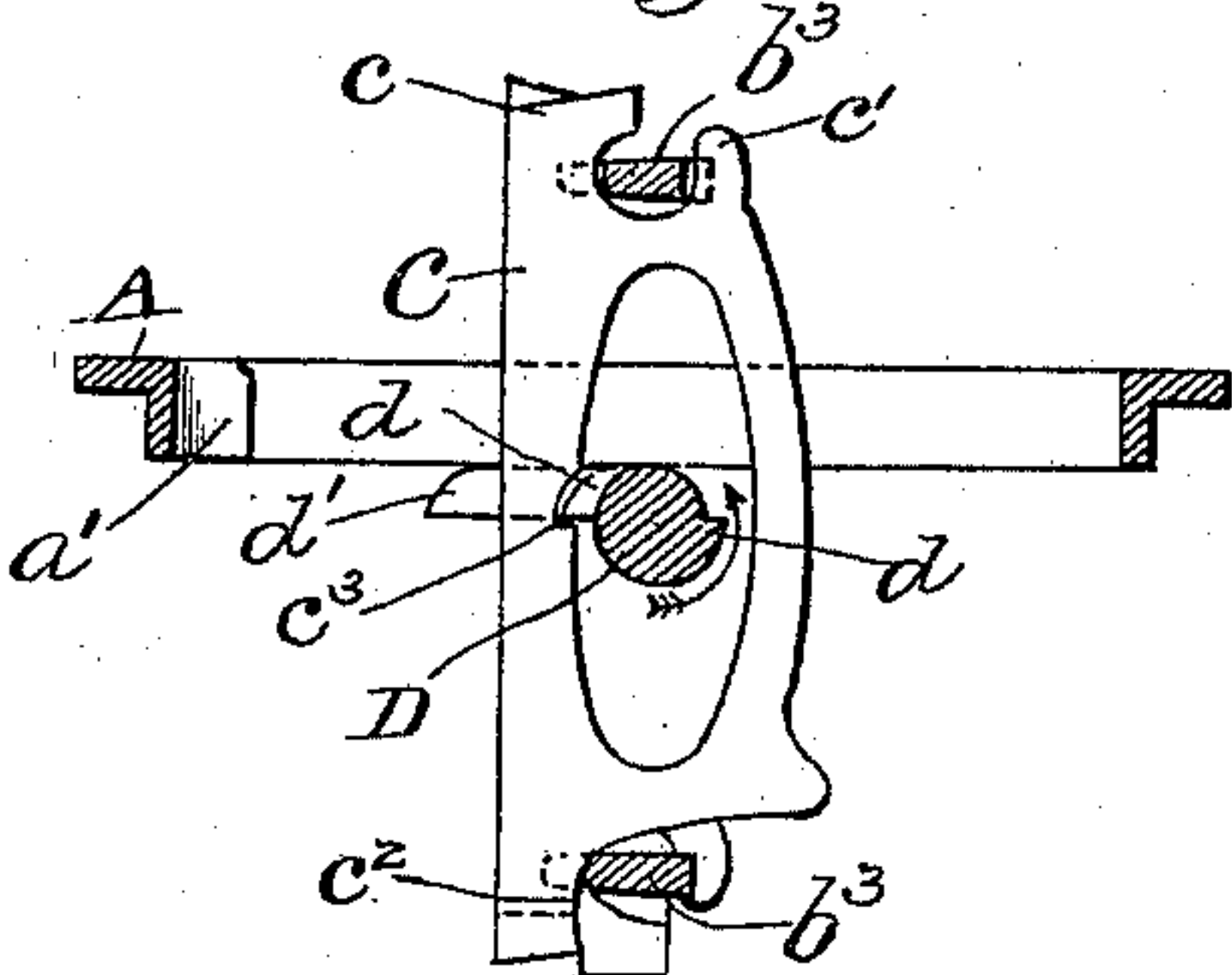
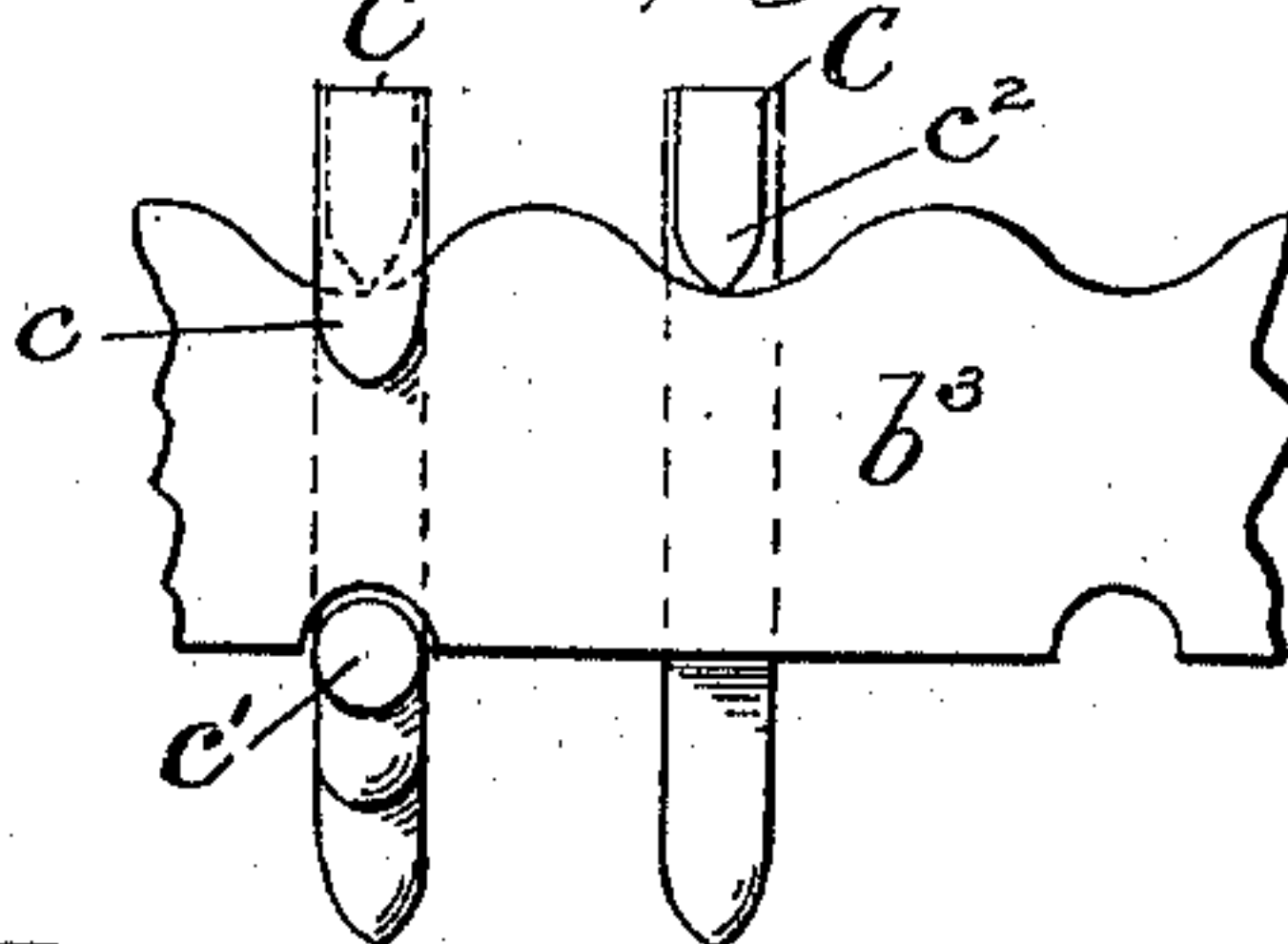


Fig. 7.



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GRATE.

SPECIFICATION forming part of Letters Patent No. 604,143, dated May 17, 1898.

Application filed May 6, 1897. Serial No. 635,317. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS FULLER, a citizen of the United States, residing at Warren, in the county of Bristol and State of Rhode Island, have invented certain new and useful Improvements in Grates; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to grates, and has especial reference to that class of grates in which a plurality of substantially parallel grate-bars are arranged to be given an up-and-down movement to shake down the ashes and a rotating movement in order to dump the fire. In my improved grate the bars are shaken in sets, one set alternating with another; but when the grate is dumped all the bars rotate together on an axis common to all.

My invention comprises a frame pivotally mounted on tubular trunnions at each end and supporting a plurality of substantially parallel grate-bars loosely hinged to the frame at one end. A shaft runs lengthwise of the frame below the grate-bars, being journaled in the tubular trunnions. It has a plurality of fingers to work in the spaces between the bars, and a plurality of cams to lift the bars when the shaft is rotated in one direction. The cams are arranged to catch in notches in the bars and turn them and the frame on its trunnions when the shaft is rotated in the opposite direction.

In the drawings, Figure 1 is a plan view of my grate. Fig. 2 is a cross-sectional elevation on the line $x x$, Fig. 1. Fig. 3 is an end view with the shaft lifted. Fig. 4 is a similar view with the shaft dropped. Fig. 5 is a cross-section of the grate when dumped. Fig. 6 shows the upper half of one of the tubular trunnions. Fig. 7 is an elevation of part of a side bar of the auxiliary frame. Fig. 8 is a detail.

The main frame A has at each end a depending bearing a , in which rests a trunnion

of the auxiliary frame B. This frame B has end bars b , from which project the tubular trunnions $B' B^2$, the upper half b' of each trunnion being preferably removable and fastened to the end bar by bolts b^2 , passing through flanges on the said upper half and through the adjacent portions of the end bars. The left-hand end of Fig. 1 shows the auxiliary frame with the upper half of the trunnion removed. The end bars b are connected by side bars b^3 , preferably formed with regularly-spaced notches in their upper and lower edges, as seen best in Fig. 7. Grooves are formed on the inside of the side bars coincident with the notches, preferably by means of ribs b^4 . One or more lugs a' are formed on the main frame to serve as stops for holding the auxiliary frame level.

The grate-bars C have at one end a hook c , preferably beveled to a blunt edge, which rests on the upper edge of the side bar b^3 in one of the notches. A lug c' lies in the notch in the lower edge of the side bar and keeps the hook c in place. The grate-bar is thus loosely hinged to the side bar b^3 . The other end of the grate-bar has a shoulder c^2 , which is beveled off and rests upon the upper edge of the side bar in one of the notches. There is no guard-lug below, so that this end of the grate-bar is free to be lifted off the side bar. The grate-bars are shown hinged alternately to the opposite side bars, being divided in this way into two sets of alternate bars; but any other arrangement of them may be adopted, if desired.

The grate-bars are made rather deep in order to give them the requisite stiffness. An opening is cored through the central portion of each grate-bar to permit a shaft D to pass lengthwise through all of them, the shaft being journaled in the tubular trunnions $B' B^2$. The shaft projects at one end through the trunnion B' and is suitably formed to receive a handle D' , by means of which it can be rotated in either direction.

Attached to or formed integral with the shaft is a plurality of cams d , one for each grate-bar, and located in the openings in said bars. When the shaft is turned, the cams strike against the upper side of said openings

and lift the bars, as indicated by dotted lines in Fig. 2. When the grate-bars are hinged alternately at opposite ends, as shown, the cams d are arranged alternately on opposite sides of the shaft D, so that the two sets of grate-bars are lifted and dropped alternately. If the grate-bars are differently arranged, the arrangement of the cams must be varied to correspond. Fingers d' are provided upon the shaft D to revolve in the spaces between the grate-bars. They serve to rake down the ashes and also to carry them to one side away from the grate.

In the upper edge of the opening in each grate-bar is cut a notch c^3 , having one side preferably radial to the shaft D, above which it stands. The shaft D is considerably smaller than the tubular trunnion B' and has on its upper side adjacent to the outer end of said trunnion a set of cogs or clutch-teeth d^2 . The upper half of the trunnion B' is also provided with a similar set of teeth b^5 .

The operation of my device is as follows: To shake the grate, the shaft is turned to the right in Fig. 2, whereby the cams lift the sets of grate-bars alternately, letting them drop suddenly as the points of the cams pass the notches c^3 . The fingers d' assist in stirring and raking down the ashes. To dump the grate, the shaft is turned to the left, when the cams catch in the notches c^3 and rotate the entire auxiliary frame B on its trunnions, tipping the grate to the position shown in Fig. 5, where it may be stopped in any suitable manner, as by a lug b^6 on the trunnion B' abutting against a shoulder a^2 on the bearing a . To restore the grate to a level position, the shaft D is lifted in its trunnion B' until its teeth d^2 engage with the teeth b^5 , as shown in Fig. 3, when a turn to the right will revolve the frame B and the grate-bars back to a normal position.

By making the grate-bars to connect loosely with the side bars at one end only in the manner shown—that is, by means of an open notch—the grate can be easily assembled or taken to pieces. To effect the latter operation, turn the grate to the position shown in Fig. 5 and it can be removed bodily from the main frame A. If then the upper halves b' of the trunnions are taken off, the shaft D can be lifted out of its bearings, the grate-bars tilting up until they slip off the side bars and come away with the shaft. They can then be slid off over the cams and fingers, the central openings being large enough to permit this.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a grate, the combination with a frame pivotally mounted, of a plurality of grate-bars loosely hinged alternately to opposite sides of the frame, a shaft capable of continuous rotation having cams arranged alternately on opposite sides and adapted to lift and drop the grate-bars, and fingers on said shaft adapted to revolve in the spaces between the grate-bars, substantially as described.

2. In a grate, the combination with a frame having tubular trunnions, of a cam-shaft capable of continuous rotation journaled in said trunnions and provided with fingers, and a plurality of grate-bars loosely hinged at one end to said frame and lying transverse to said shaft, with spaces between them for the fingers, substantially as described.

3. In a grate, the combination with a frame having tubular trunnions and carrying grate-bars, of a cam-shaft journaled in said trunnions and smaller in diameter than the interior of one of them, teeth on said large trunnion, and similar teeth on the shaft, whereby when said teeth are interlocked, the turning of the shaft will turn the frame on its trunnions, substantially as described.

4. In a grate, the combination with a frame having notched side bars, of grate-bars having at one end a hook and a guard-lug to engage with said notches, and at the other end only a shoulder to rest upon the side bar with no portion projecting under said bar, and means for lifting the grate-bars, substantially as described.

5. In a grate, the combination with a frame pivotally mounted on tubular trunnions, of a plurality of grate-bars supported on said frame, a cam-shaft loosely journaled in said trunnions and serving to actuate said bars, and teeth on said shaft and on one of said trunnions, whereby the shaft can be used to turn the frame when said teeth are interlocked, substantially as described.

6. The combination with the main frame A having depending bearings a , of a frame B having tubular trunnions B' B² resting in said bearings, said frame B being composed of end bars b , side bars b^3 having notches and provided with ribs b^4 , open grate-bars C having hooks c , lugs c' , shoulders c^2 and notches c^3 , a cam-shaft D having cams d , fingers d' and teeth d^2 , and teeth b^5 on one of the trunnions of the frame B, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CORNELIUS FULLER.

Witnesses:

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ALFRED H. HOOD.