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Patented Jan. 10, 1899.

C. M. DAY.
BREAKING AND FEEDING APPARATUS.

(Application filed June 9, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

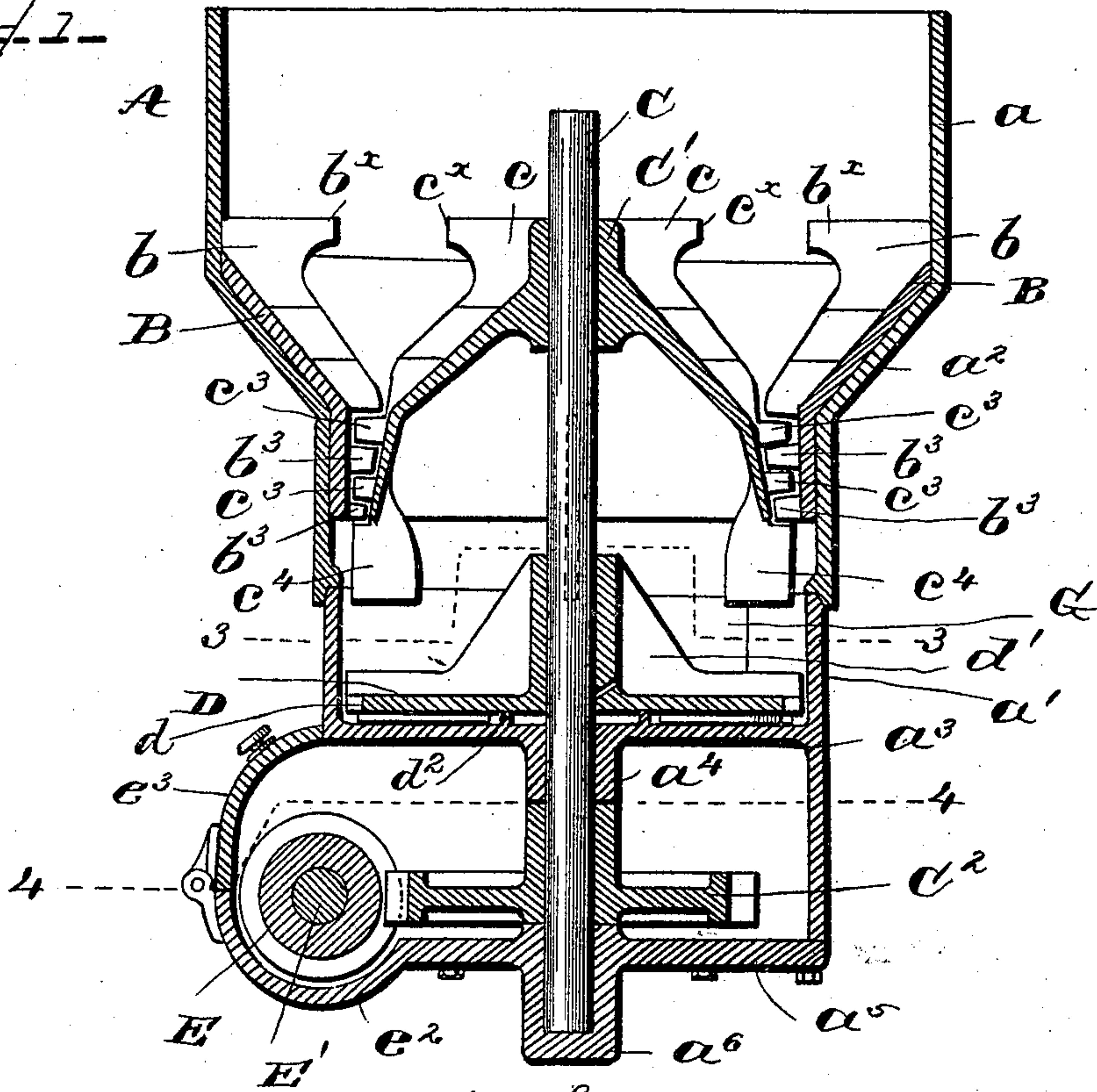
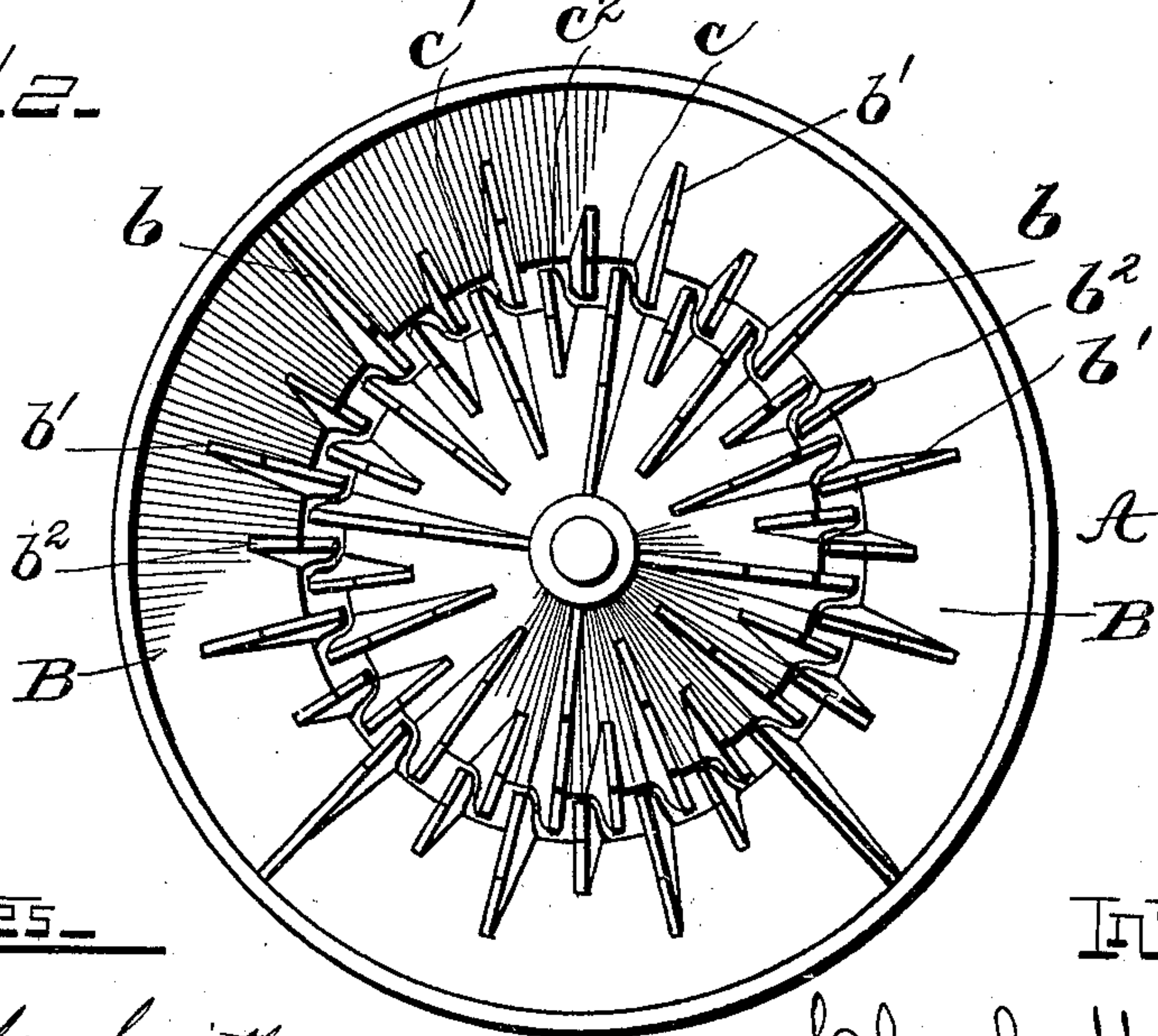


Fig. 2.



WITNESSES—

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BREAKING AND FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 617,523, dated January 10, 1899.

Application filed June 9, 1898. Serial No. 683,010. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. DAY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Breaking and Feeding Apparatus; and I do hereby 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.

My invention is an improvement in breaking and feeding apparatus for coal and substances of a similar nature; and it consists in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a vertical sectional view of the apparatus. Fig. 2 represents a top plan view of the same. Fig. 3 represents a horizontal transverse sectional view on the line 3 3 of Fig. 1, and Fig. 4 represents a similar view on the line 4 4 of Fig. 1. Fig. 5 is a detail sectional view showing the discharge-aperture and the adjustable controlling-gate therefor.

A represents the shell or casing of the apparatus, which comprises the upper portion or hopper a , provided in this instance with the inclined portion a^2 and the lower cylindrical portion a' . The inclined portion may, however, be omitted and the hopper and lower cylindrical portion may be of uniform diameter. In the lower cylindrical portion a' is the horizontal bottom plate a^3 , which is provided with a central bearing a^4 , and below the bottom plate and parallel therewith is the bearing-plate a^5 , provided with a central step-bearing a^6 .

B B represent the breaking-plates, forming an inside cylinder which is secured to the walls of the casing A, said plates being provided with a series of breaking-webs of different vertical lengths, as shown in Figs. 1 and 2. The webs b extend from the top of the breaking-plates nearly to the bottom of the same and are provided at the top with inwardly-

projecting portions b^x , which catch and break the larger particles. The breaking-plates B are also provided intermediate the long webs b with shorter webs b' and b^2 , as shown in Figs. 1 and 2. Below these webs the cylinder is provided with a series of horizontal breaking-lugs b^3 .

C represents a vertical shaft mounted in the bearing a^4 and step-bearing a^6 and carrying at its upper end the breaking-cone C'. This cone is provided exteriorly with a series of breaking-webs c c' c^2 , arranged correspondingly to the webs b b' b^2 , the longest webs c being provided with outwardly-projecting portions c^x in the horizontal plane of the projections b^x . (See Fig. 1.) The cone C is provided below the webs with breaking-lugs c^3 , which alternate with the lugs b^3 on the breaking-plates. The breaking-cone is also provided with a series of downwardly-extending agitating-fingers c^4 .

D represents a movable bottom located above the bottom plate a^3 of the lower cylindrical casing a' and consisting in this instance of a horizontal plate or disk having a central hub secured to the shaft C, so that the plate shall revolve therewith. This bottom, which has a very slow movement, receives the material directly from the breaker and keeps it in slow motion around the casing, so as to bring all portions of it to the delivery-aperture and prevent the clogging of the machine, which would otherwise result. This plate or disk is provided with a serrated or notched peripheral edge d , (see Fig. 3,) and its upper face is provided with a series of webs or ribs d' , extending from the periphery toward the center, but not being disposed radially on the disk, the said webs being very low adjacent to the periphery of the disk and increasing in height adjacent to the hub. These webs or ribs are so arranged as to have a tendency to convey the material on the disk or plate toward the periphery. The lower face of the disk or plate D is also provided with cleaning-ribs d^2 , extending from the periphery inward to conduct toward the periphery any material which may work under the said disk or plate in the operation of the machine. Between the bottom plate a^3 and the bearing-plate a^5 the shaft

C is provided with a worm-wheel C^2 , the teeth of which are engaged by a worm E on a driving-shaft E' , which is mounted in suitable bearings e and provided with a driving-pulley e' . The worm E is preferably incased in a trough e^2 , provided with a hinged cover e^3 . While I have found this to be a very advantageous arrangement for driving the shaft C, it is obvious that I may drive it in other ways if desired.

The part a' of the casing A is provided at one side with a delivery-aperture a^7 , the lower edge of which extends below the revolving plate or disk D, as shown in Fig. 5, and F represents a delivery chute or spout for conveying the material from the apparatus. The inner edge of this spout F extends within the serrations d on the periphery of the disk D, so that any material which is carried around in said serrated edge will fall vertically therefrom into the chute. The delivery of the material through the aperture a^7 is controlled by means of an adjustable gate G, which is pivoted to the part a' at g , at one side of the aperture a^7 , said gate being provided with a horizontally-disposed portion or guard G' adjacent to the upper edge of the aperture a^7 . In order to enable the gate G to be maintained in any desired position, I provide it with an adjusting-arm g' , the outer end of which extends through a slot g^2 in a stationary arm g^3 , which is preferably curved concentrically with the point of pivoting g . The said arm g' is provided with a shoulder g^4 , which engages the inner side of the arm g^3 , and the outer extremity of the arm is threaded and provided with a wing-nut or equivalent device for clamping the arm g' to the arm g^3 to hold the gate in any position to which it may be adjusted.

The operation of the apparatus is as follows: The material, which may be coal or other material of a similar nature, is placed in the hopper a and will be broken up by the breaking webs and lugs of the breaking-plates and the breaking-cone as it passes downward into the receptacle a . In the latter receptacle the broken material is kept in motion around the shaft C by the revolving bottom D. Portions of the broken material as it moves around within the receptacle a' will be caught by the edges of the adjustable gate G and deflected outwardly into the delivery chute or spout F, by which it is delivered to any desired point. By setting the gate G farther inward toward the shaft C a greater amount of material will be fed to the spout and by setting it nearer the wall of the receptacle a' the amount allowed to pass to the spout will be decreased. It will thus be seen that the feed of the apparatus can be very accurately regulated by adjusting the swinging gate G in the manner hereinbefore described.

What I claim, and desire to secure by Letters Patent, is—

1. In a breaking and feeding mechanism,

the combination with the casing provided with a discharge-opening at one side, of the breaking mechanism and a slowly-movable bottom below the breaking mechanism adapted to receive the material directly therefrom and carry portions at a distance from the discharge-aperture toward said aperture, substantially as described.

2. In a breaking and feeding mechanism, the combination with the casing provided with a discharge-aperture at one side, of breaking mechanism in said casing and a horizontal slowly-movable revoluble bottom in said casing below the breaking mechanism and adapted to receive material directly therefrom, for conveying the portions of the material at a distance from the delivery-aperture toward said aperture, substantially as described.

3. In a breaking and feeding apparatus, the combination with the casing provided with a discharge-aperture, of the breaking mechanism, the horizontal revoluble disk or plate below said breaking mechanism and adjacent to said aperture and an adjustable gate adjacent to said aperture having a portion extending over the said horizontal plate or disk, substantially as described.

4. In a breaking and feeding apparatus, the combination with the casing provided with a discharge-aperture, of the breaking mechanism, the horizontal revoluble plate below said breaking mechanism and adjacent to said aperture and an adjustable gate adjacent to said aperture, extending over said horizontal plate or disk, and having a horizontally-disposed portion or guard adjacent to the upper edge of said aperture, substantially as described.

5. In a breaking and feeding apparatus, the combination with the casing provided with a discharge-aperture, of the breaking mechanism and the horizontal revoluble plate below said breaking mechanism and adjacent to said aperture, said plate being provided on its upper face with ribs or webs extending from the periphery inward and with a serrated peripheral edge and a delivery-chute engaging the said discharge-aperture and extending beneath the serrated edge of said plate, substantially as described.

6. In a breaking and feeding apparatus, the combination with the casing provided with a discharge-aperture, of the breaking mechanism, a horizontal revoluble plate below said breaking mechanism, and adjacent to said aperture, said plate being provided with a serrated peripheral edge, a series of ribs or webs on its upper face and a series of cleaning-webs on its lower face, and a delivery-chute engaging said discharge-aperture and extending beneath the serrated edge of said plate, substantially as described.

7. In a breaking and feeding apparatus, the combination with the casing provided with a discharge-aperture, the breaking-plates and a revoluble breaking-cone provided with

downwardly-extending agitating-fingers, of a horizontal revoluble plate below said cone and fingers, and adjacent to said discharge-aperture, substantially as described.

5 8. In a breaking and feeding apparatus, the combination with the casing provided with a discharge-aperture, the breaking-plates and the revoluble breaking-cone provided with downwardly-extending agitating-fingers, of a
10 horizontal revoluble plate below said cone and fingers and adjacent to said aperture and an adjustable gate adjacent to said aperture and adapted to extend above said horizontal plate, substantially as described.

15 9. In a breaking and feeding apparatus, the combination with the casing, of the breaking-plates provided with vertically-disposed breaking-webs, certain of said webs having inwardly-extending projections adjacent to
20 their upper ends, and a revoluble breaking-cone provided with vertically-disposed breaking-webs, certain of said webs being provided

with outwardly-extending projections substantially in the plane of said inwardly-extending projections, substantially as de- 25 scribed.

10. In a breaking and feeding apparatus, the combination with the casing provided with a discharge-aperture and breaking-plates provided with vertical webs of different 30 lengths and horizontal projections below said webs, of the breaking-cone provided with vertical webs of different lengths, and horizontal projections alternating with those of the breaking-plates, and a horizontal revoluble 35 plate or disk below said breaking-plates and cone, and adjacent to the discharge-aperture, substantially as described.

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

CHARLES M. DAY.

Witnesses:

L. P. WHITAKER,
J. D. KINGSBERRY.