

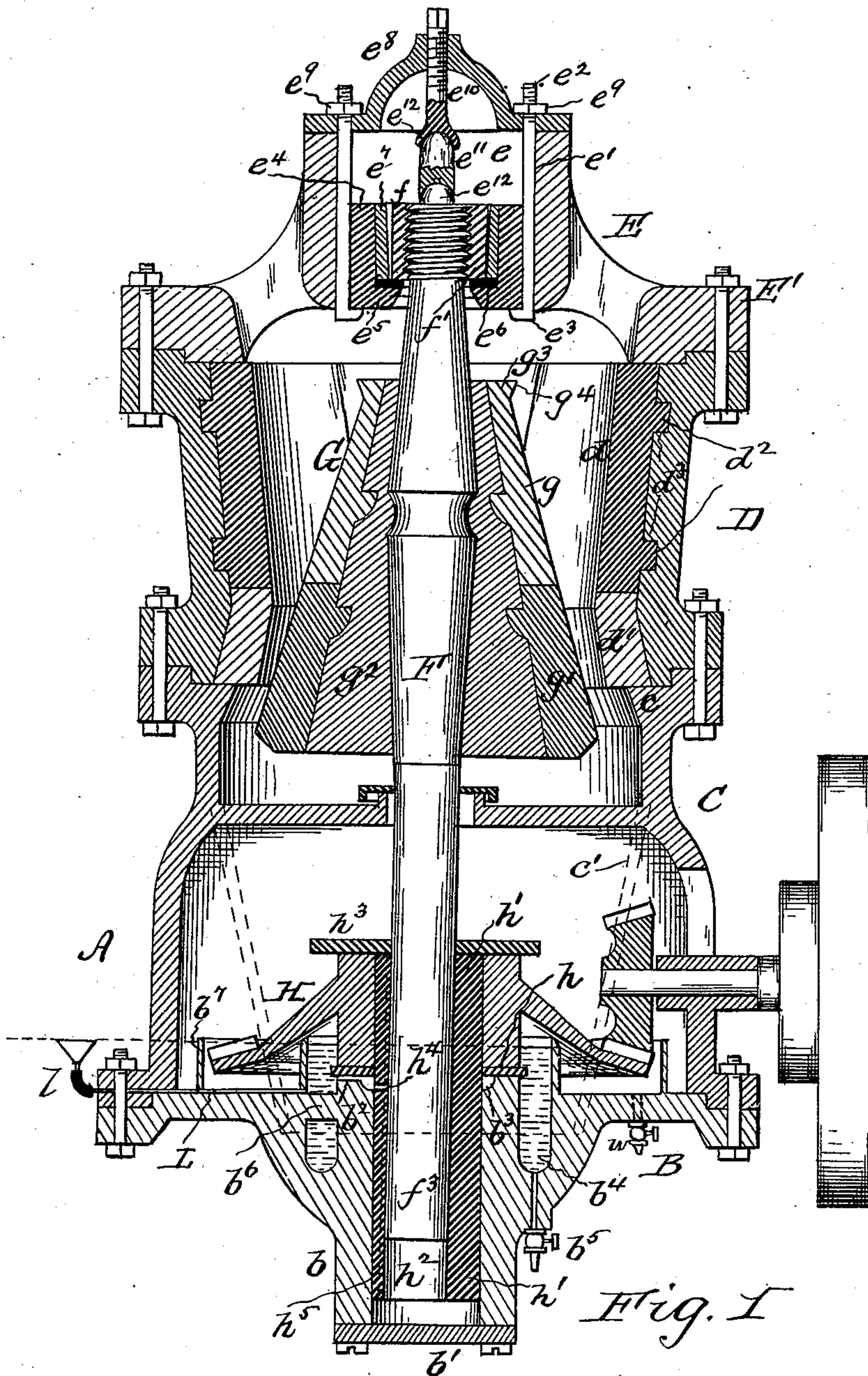
(No Model.)

2 Sheets—Sheet 1.

R. McCULLY.
STONE BREAKER.

No. 557,216.

Patented Mar. 31, 1896.



WITNESSES:

M. F. Halleck
L. R. Miller

INVENTOR

Robt. McCully
By S. J. Van Stavern
ATTORNEY

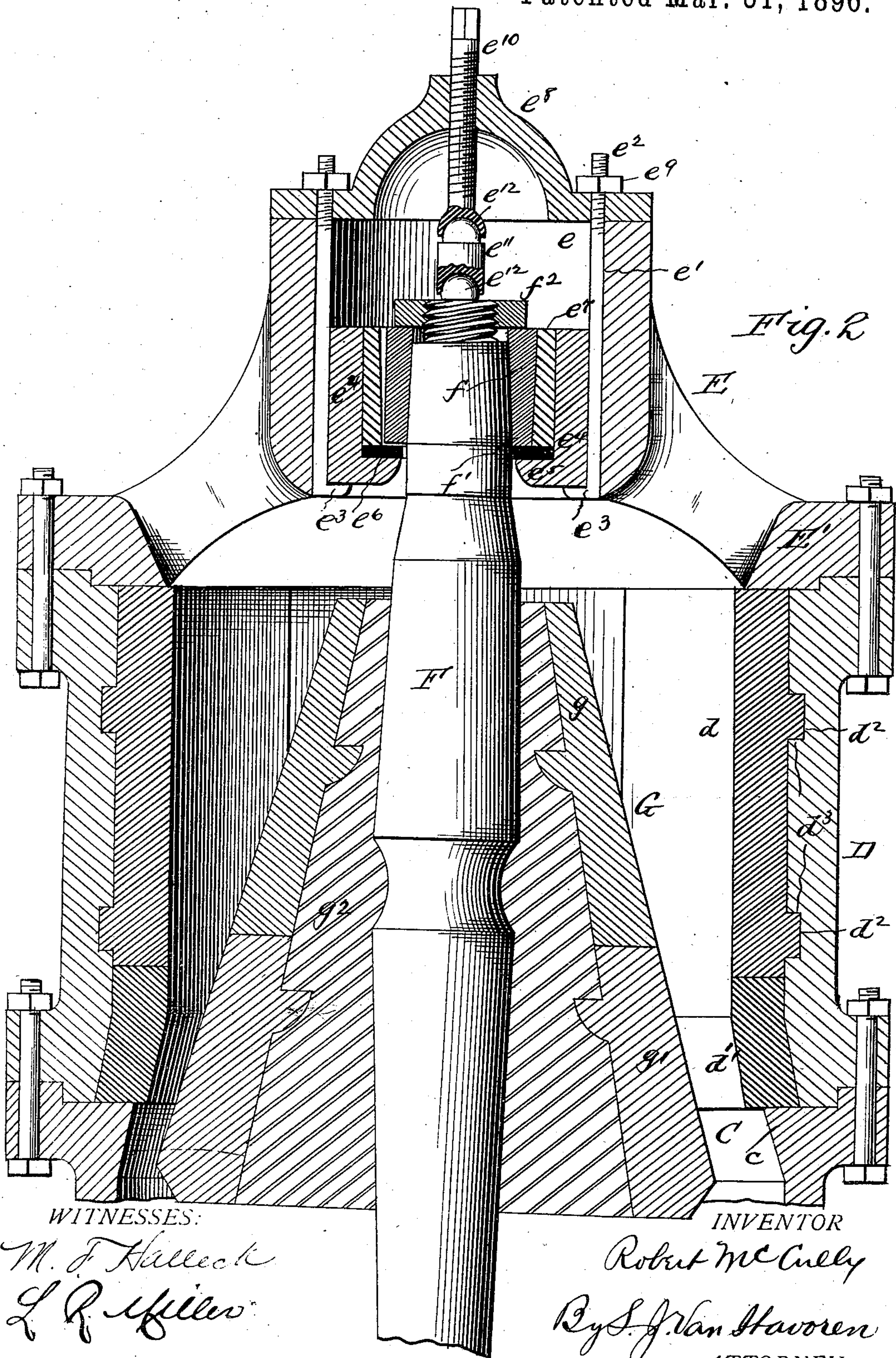
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UNITED STATES PATENT OFFICE.

ROBERT McCULLY, OF PHILADELPHIA, PENNSYLVANIA.

STONE-BREAKER.

SPECIFICATION forming part of Letters Patent No. 557,216, dated March 31, 1896.

Application filed September 17, 1886. Serial No. 213,796. (No model.)

To all whom it may concern:

Be it known that I, ROBERT McCULLY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Stone-Breakers, of which the following is a specification, reference being had therein to the accompanying drawings, wherein—

Figure 1 is a vertical section of a stone-breaking and ore-crushing machine embodying my improvements; and Fig. 2 is a like view of the upper part of the machine drawn to an enlarged scale, illustrating modifications of construction of detail parts.

My invention has relation to stone or other crushing machines, having particular reference to that form of the same shown and described in Letters Patent of the United States, granted to me September 7, 1886, No. 348,757; and it has for its object the construction of parts to economize in the cost of manufacture, to increase the durability and efficiency of the machine, and to diminish the friction between its working parts and thereby correspondingly lessen the power required for operating the machine.

My invention accordingly consists of the combination, construction and arrangement of parts, as hereinafter described and claimed.

In the drawings, A represents the frame or casing of the machine, comprising the bottom plate B, chute or outlet-chamber C, crushing-chamber D, and top plate E, preferably flanged and bolted together, as shown. F indicates the gyratory shaft, and G the crusher-head mounted thereon within the crushing-chamber D.

The top plate E has a central hub-opening *e*, having vertical grooves *e'*, in which are inserted bolts *e²*, upon the heads *e³* of which rests a solid or continuous steel or other suitable sleeve *e⁴*, having at its lower edge an inwardly-projecting flange *e⁵*. Upon the top of the latter is preferably placed a steel washer *e⁶*, and upon it rests a steel bushing *e⁷*, the bore of which preferably decreases or tapers downwardly, as shown, and in this bore is inserted the cylindrical head *f* of the

gyratory shaft F, the lower edge or shoulder *f'* of said head *f* resting or impinging upon the washer *e⁶*. The taper of the bore of bushing *e⁷* provides suitable space to admit of the usual inclination of the gyratory shaft F and to provide contact on only one side of the head *f* with the bushing *e⁷* as the shaft gyrates. The head *f*, therefore, has a rolling movement within the bushing *e⁷*, and all grinding or rubbing friction between said parts is avoided, and all wedging or tightening of the head in its bearing is prevented, no matter what weight or pressure it is subjected to.

The opening *e* is closed by a cap or cover *e⁸*, through which pass the bolts *e³*, which have at their upper ends suitable adjusting-nuts *e⁹*, which also serve to fasten the cap or cover *e⁸* to the plate E.

To keep the shaft F from raising during crushing, a set-screw *e¹⁰*, passing through cover *e⁸* and abutting against the top of the shaft-head *f*, may be employed. I prefer, however, to insert between the screw *e¹⁰* and shaft-head *f* a loosely-supported knuckle or toggle *e¹¹*, having ball-and-socket bearings *e¹²* with said screw and shaft-head, as shown, to avoid a grinding friction between said parts during the gyration or movement of the shaft-head *f*.

The head *f* may be formed separate from the shaft F and screwed thereto, as indicated in Fig. 1, or placed loosely thereon and held firmly in place by a set-nut *f²*, as shown in Fig. 2, or it may be otherwise formed, as desired.

The shaft and crusher-head it will be noted are supported upon washer *e⁶*, which in turn is maintained in position by sleeve *e⁴* and bolts *e³*, so that the latter support both the crusher-head shaft and its top bearing, and by adjusting nuts *e⁹* on said bolts the said parts are raised and lowered, as desired, to effect any variation in the degree of crushing, or for other purposes, as fully set forth in my aforesaid patent.

The crushing-chamber D has preferably two sets of working faces *d* and *d'*, the set *d* of which is preferably made in sections having on their rear sides lugs *d²*, which fit into recesses *d³* in the inner wall of chamber D. The

set d' is in one piece and rests upon the top of the chute-chamber C. These faces d and d' are firmly held in position by the rim E' of plate E, overlapping the top edge of faces d .

5 The faces d and d' are reversely tapered, or have different directions, as shown, while the crusher-head G has the same, or one taper from top to bottom. The relative taper of the crusher-head and faces d and d' is such
10 that the material is crushed or broken coarsely or partially reduced between the faces d and the adjacent part of the crusher-head and finely reduced or pulverized between the faces d' and the part of the crusher-head adjacent
15 thereto.

The crusher-head working faces may be in two pieces g g' , as shown, and they are secured to a sleeve g^2 , which in turn is cast or otherwise fastened to the shaft F in a manner set forth in pending applications of even
20 date herewith, or in any other desired way.

At the top of the crusher-head at its outer edge is formed a flange g^3 , which preferably has a biting or sharp edge g^4 , which bites the
25 material in the crushing-chamber as it is broken or crushed and prevents it flying or jumping out of said chamber.

The bottom plate B has a depending central opening or bearing b , having a removable
30 bottom b' . Upon the top of this bearing rests a steel washer h , which supports and upon which revolves the driving-gear H, having in its bore a sleeve h' , provided with an eccentric or cam bore h^2 for the reception of the
35 lower end f^3 of shaft F.

If desired, the top of the wheel H may be covered by a plate or protector h^3 to keep dirt and dust from said wheel, sleeve, and shaft-bearings, or any other form of protector may
40 be used.

In the top of bearing b is a transverse groove or duct b^2 , which communicates with an annular recess b^3 , formed around the inner edge of said top, and in line therewith in sleeve h'
45 is a transverse opening h^4 for oiling purposes, and, if desired, vertical grooves may be cut on the inside and outside of sleeve h' , as indicated by dotted lines h^5 , Fig. 1, for a like purpose.

50 Around the upper part of bearing b and in plate B is formed an oiling-gutter and sediment-chamber b^4 , which are provided with a drip-cock b^5 , if desired, and this gutter extends upwardly above the top of plate B and
55 is bridged by radial bars b^6 to maintain the full strength of said plate B, as fully described and shown in two other pending applications of even date herewith, Serial Nos. 213,795 and 213,797, respectively.

60 Gutter b^4 is provided with an oil-supply pipe L, the filling end l of which is about on a line with the top of the gutter, so that the oil will rise in filling end l and in the gutter simultaneously to provide for ascertaining when
65 the bearing is filled with oil and to prevent

overflow therefrom. Any such overflow, however, from gutter b^4 to plate B is retained in the machine by the annular flange b^7 , formed on the upper side of plate B, outside of the driving-gear H. Any waste oil accumulating
70 on plate B is drained off through cock w . The oil flowing into gutter b^4 passes through duct or ducts b^2 , recess b^3 , and openings h^4 to bearing b until it and the gutter are filled, and all the bearing parts of the lower end of
75 the shaft and its driving-gear are thus thoroughly oiled.

The one or more chutes c' for chamber C are constructed and arranged as desired; but I prefer to make them as set forth in my afore-
80 said Letters Patent.

In Fig. 2 the working faces d of crushing-chamber D are made straight vertically, and the faces d' only are tapering, the result in this case being the same as that above described
85 for the reversely-tapered faces d and d' .

I prefer to make the faces d straight or directly vertical, as shown in Fig. 2, and give to the faces d' a taper corresponding to that of the crusher-head, as the latter having the
90 same or but one taper from top to bottom prevents lodging of the ore or material at any point on its working face.

What I claim is—

1. In a stone-breaker, the combination of a
95 housing or frame top plate having a central hub-opening, a gyratory shaft having an enlarged cylindrical upper end, a sleeve or bearing in said hub-opening, said sleeve having at its lower edge an inwardly-projecting flange
100 forming a support for the lower end or edge of said cylindrical end of the shaft and adjusting mechanism for raising and lowering said sleeve and shaft, substantially as set forth.

2. In a stone-breaker, the gyrating shaft F
105 having head f , bushing e^7 , sleeve e^4 having flange e^5 , top plate E having opening e and bolts e^2 having adjusting-nuts e^9 , substantially as set forth.

3. In a stone-breaker, the combination of a
110 gyratory shaft supported at the top of the machine, and having an enlarged upper head f , a top plate provided with a central hub-opening, a bearing composed of a sleeve supporting a washer, and a bushing resting on
115 said washer, substantially as set forth.

4. In a stone-breaker, the combination with frame A and top plate E having opening e , of gyratory shaft F having head f , bushing e^7 washer e^6 , sleeve e^4 having flange or shoulder
120 e^5 and bolts e^2 , substantially as shown and described.

5. In a stone-breaker the combination of a crushing-chamber having separate working faces d d' , the gyratory shaft F having crusher-
125 head G provided with a single taper from top to bottom and a top-edge flange g^3 , and driving mechanism located below the crushing-chamber substantially as set forth.

6. In a stone-breaker the combination of a 130

vertical gyratory shaft, a crusher-head G having a top-edge flange g^3 , and a crushing-chamber D, substantially as and for the purpose set forth.

- 5 7. In a stone-breaker, the combination with the gyrating shaft F and its top bearing, of supporting and adjusting devices for said bearing and shaft, set-screw, and knuckle or

toggle e^{11} having ball-and-socket bearings on said screw and shaft, substantially as set forth. 10

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

ROBERT McCULLY.

Witnesses:

S. J. VAN STAVOREN,

CHAS. F. VAN HORN.