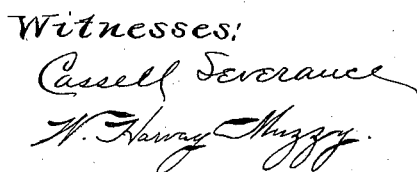


3 Sheets—Sheet 1.

# FRAME AND HOPPER FOR GYRATORY STONE CRUSHERS.

Patented Sept. 4, 1894.



Inventor:-  
 Avery Eugene Hoyle  
 by Messrs. Fenwick Kearse  
 his  
 Attorneys.

(No Model.)

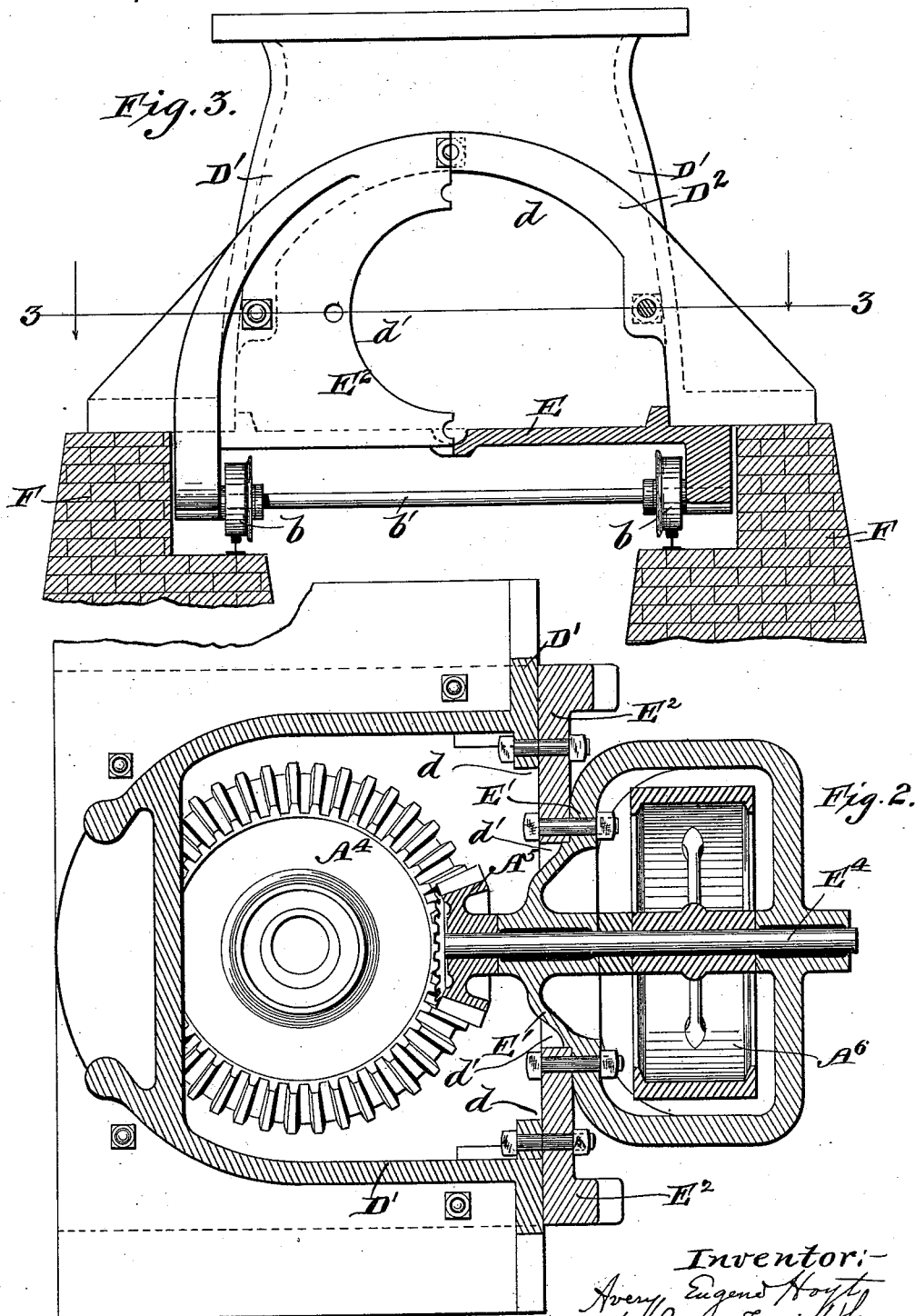
3 Sheets—Sheet 2.

A. E. HOYT.

### FRAME AND HOPPER FOR GYRATORY STONE CRUSHERS.

No. 525,419.

Patented Sept. 4, 1894.



Witnesses:-  
 Cassell Severance  
 W. Harvey Muzzy.

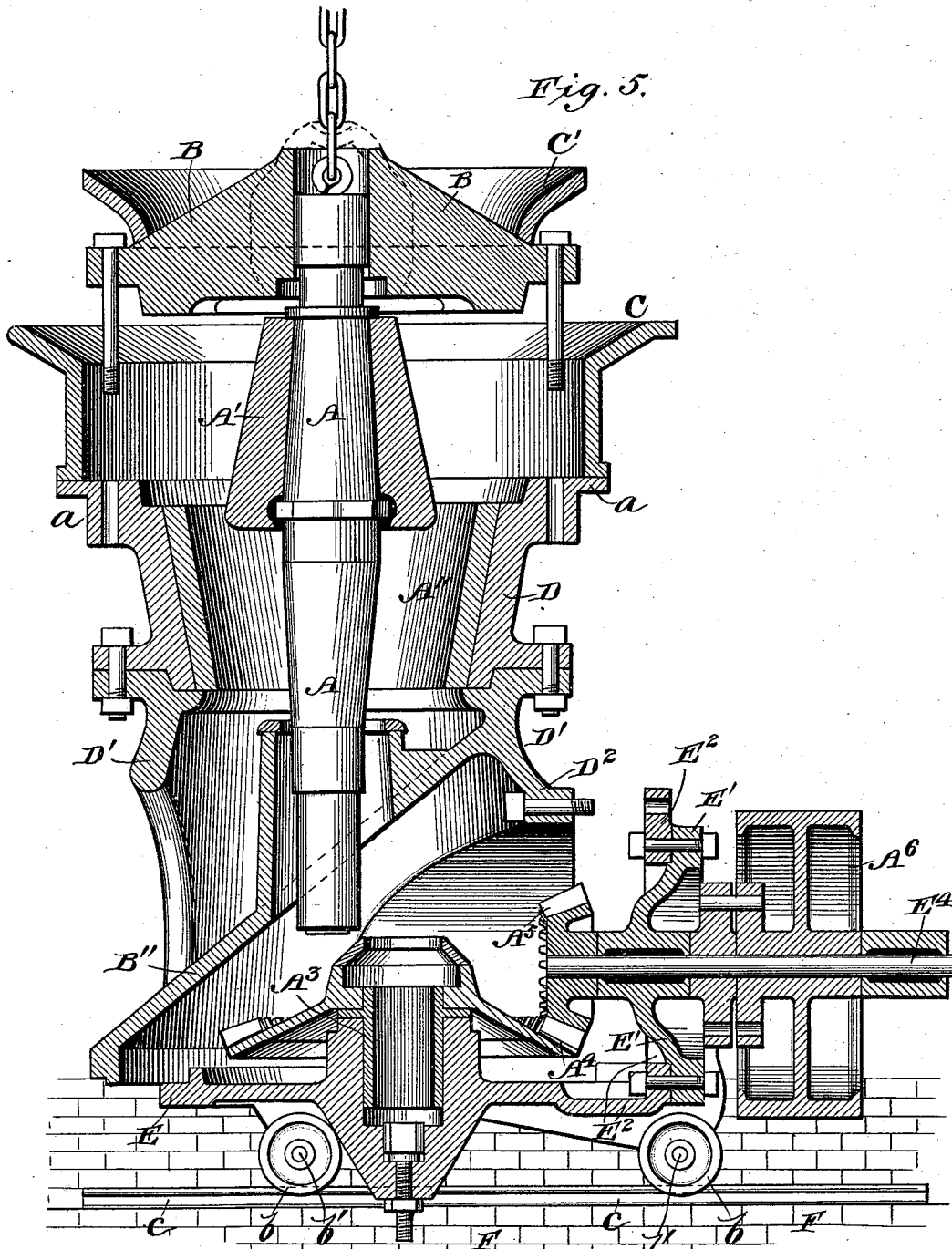
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A. E. HOYT.

FRAME AND HOPPER FOR GYRATORY STONE CRUSHERS.

No. 525,419.

Patented Sept. 4, 1894.



Witnesses,  
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# UNITED STATES PATENT OFFICE.

AVERY EUGENE HOYT, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GATES  
IRON WORKS, OF SAME PLACE.

## FRAME AND HOPPER FOR GYRATORY STONE-CRUSHERS.

SPECIFICATION forming part of Letters Patent No. 525,419, dated September 4, 1894.

Application filed December 2, 1893. Serial No. 492,618. (No model.)

*To all whom it may concern:*

Be it known that I, AVERY EUGENE HOYT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Frames and Hoppers for Gyratory Stone-Crushers; 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 relates to certain improvements in gyratory stone breakers, and its object is, by means of certain new and useful constructions, arrangements and combinations of parts as will be hereinafter described and specifically claimed, to render the type of machine mentioned more accessible for erection and repairs, and thus avoid large expense for labor and loss of time.

In the accompanying drawings, Figure 1. is a vertical longitudinal section of a stone crusher embodying my invention. Fig. 2. is a horizontal transverse section on the line of the counter shaft, see line 3—3 of Fig. 3. of the drawings; the gyrating shaft being removed. Fig. 3. is a rear elevation of the lower portion of the shell or frame, the bottom plate being shown half in elevation and half in section, and the gearing being removed; and Fig. 4. is a detail view showing more plainly the manner in which the primary hopper is supported in the main hopper, independently of the crusher. Fig. 5. is a vertical longitudinal section of a crusher embodying my invention with the parts in position ready for the withdrawal of the bottom plate carrying the actuating mechanism.

My features of invention are illustrated in connection with an ordinary gyratory stone crusher comprising, for instance, a main frame or shell D and D', the section D having a spider B mounted upon it, and the section D' having an inclined diaphragm B'' constructed within it. Within this shell or frame is a gyratory shaft A carrying a crushing cone A'; said crushing cone operating within a crushing concave A'', and the gyratory shaft having its lower end fitted in an eccentric box A<sup>3</sup>, and said eccentric box being operated by gearing as A<sup>4</sup> and A<sup>5</sup>.

My improved form of hopper is constructed

as follows: It consists of an outer main hopper C and an inner auxiliary hopper C'. The flare of the main hopper is on the same incline plane as the greater portion of the flare of the inner auxiliary hopper. The inner hopper fits the inner diameter of the cylindrical part of the main hopper, and therefore can be slipped down into the same and moved up out of the same. Its outer diameter is only slightly increased over that of the spider D upon which it rests, as illustrated in the drawings. The main and primary hoppers thus constructed form as it were one continuous hopper. The construction is such, that the spider B with the inner auxiliary hopper can be raised bodily up through the main hopper C. The main hopper C rests upon a horizontal flange *a* formed on the upper edge of the section D of the shell or frame. And by this means access can be had to the crushing head and concave and other parts of the machine for repairs after the spider and auxiliary hopper have been lifted out of position, which adjustment can be effected without disturbing the surrounding woodwork or platform that are usually employed about a machine of this type, but are not shown in the drawings. The auxiliary hopper C' may be formed integral with the spider B, without departing from the principle of my invention.

The lower portion of the machine, or bottom plate E as it is commonly called, is in the form of an angle plate having a rear portion E<sup>2</sup> extending vertically upward and bolted to the face of a reinforcement collar D<sup>2</sup> surrounding the rear opening *d* in the section D' of the shell or frame, and also being bolted to said frame in the ordinary manner on the bottom. This bottom plate is provided with small truck wheels *b* arranged on an axle *b'*. These wheels run upon rails *c* suitably arranged on foundations F. By this construction facilities are afforded for running out the bottom plate through the rear opening *d*, independently of the superstructure and parts which it supports. To accomplish this withdrawal of the bottom plate, the bolts by which it is held to the section D' of the shell or frame, and the bolts by which the spider B is held to the section D of said frame, are released, and a lifting device, consisting of an ordinary eye bolt tapped into

the upper end of the gyratory shaft, in the ordinary way, and a crane hook, are brought into action, and thereby the gyratory shaft with its crushing cone or head, together with the spider and auxiliary hopper are drawn upward out of the eccentric box and its gear, to a sufficient height to clear the bottom plate and allow said plate and the gears resting on and connected to it, to be withdrawn from the machine; said plate traveling on its wheels and the foundation rails, as shown in Fig. 5.

As usual, in the center hub of the bottom plate E, is formed a bearing for the eccentric box and its gear, also a downwardly extending hub carrying a lighter-screw and step; the rear portion E<sup>2</sup> having the circular opening d' in it, into which is fitted a plate or disk shaped casting E' carrying bearings for a counter shaft E<sup>4</sup> upon which are mounted a driving pulley A<sup>6</sup> and the pinion A<sup>5</sup> for actuating the machine.

It will be seen that by having the casting E constructed separate from and bolted to the upright angular portion E<sup>2</sup> of the base plate E, the counter shaft E<sup>4</sup> and its attached wheels A<sup>5</sup>, A<sup>6</sup> can be moved laterally separately from the base plate, whenever it is desired to get access to the eccentric bearing A<sup>3</sup> and gear A<sup>4</sup> for any purpose.

I contemplate employing a suitable adjusting mechanism and attaching the same to the shell or frame or other part of the crusher, and by such mechanism provide for lowering the bottom plate to a sufficient extent to have it rest upon an independent car H as indicated by dotted lines in Fig. 1. and thus obviate the necessity of moving upward the gyratory shaft, spider and auxiliary hopper. This I regard as an equivalent of my invention in that part which provides for the removal of the bottom plate on wheels running on rails, without disturbing the main shell or frame and other parts.

In operating to remove the bottom plate after the shaft, spider and auxiliary hopper are properly raised, the gearing along with the plate passes out through the rear opening d which is surrounded by the reinforcing portion D<sup>2</sup>, and in replacing it, it is returned through said opening.

What I claim as my invention is—

1. A hopper for a stone crusher formed of two or more sections or rings arranged on different planes, and one section forming a continuation of the other so as to form a continuous unbroken surface in the said hopper and one of said sections being adapted to be lifted up and away from the other section without disturbing the latter substantially as described.

2. A hopper for a stone crusher formed of two or more sections or rings arranged on different planes, and one section forming a continuation of the other so as to present an unbroken surface in the said hopper and the inner one of said sections resting upon an in-

dependent and different support than that upon which the section or ring immediately surrounding it rests or is supported, substantially as described.

3. The combination in a hopper for a crusher, of two or more sections arranged on different planes and forming a continuous unbroken surface and so constructed that either one of said sections may be removed without disturbing the other substantially as described.

4. In a gyratory stone crusher, the combination, of a crusher frame, a hopper constructed of outer and inner sections or rings arranged on different planes and forming a continuous unbroken surface, a gyratory shaft, a crusher head thereon, a spider mounted on said frame and supporting the inner section of the hopper; the said shaft, spider and inner hopper section being so constructed that they may all be removed without interference from the outer section of the hopper, substantially as described.

5. In a gyratory stone crusher, the combination with the crusher casing, shaft and crusher head carried thereby, of a laterally moving base plate carrying the driving shaft, its gearing and the actuating mechanism of the crusher, and anti-friction devices supporting the said base plate independently of the crusher frame whereon it can be withdrawn in a horizontal plane from beneath the said frame and crusher head shaft, substantially as described.

6. In a gyratory stone crusher, the combination of a frame, a hopper constructed of outer and inner sections or rings, a gyratory shaft mounted in said frame, a crusher head on said shaft, a spider also mounted on said frame, a base plate carrying the driving shaft, its gearing and the actuating mechanism of the crusher and anti-friction devices supporting the base plate independently of the crusher frame whereon it can be withdrawn in a horizontal plane from beneath the frame and crusher head shaft, substantially as described.

7. In a gyratory stone crusher, the combination of a frame D' a gyrating shaft A, base plate E having an upright angular portion E<sup>2</sup> provided with an opening and carrying the crusher operating means, a removable disk E' carrying bearings for a counter shaft on which is mounted a driving pulley and pinion; said disk being adapted to close the said opening in the angular plate and to be bolted to said plate, whereby the base plate and all the gearing mentioned, or simply the disk e' and the gearing supported by it can be moved laterally, at will, substantially as described.

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

AVERY EUGENE HOYT.

Witnesses:

A. J. GATES,  
P. W. GATES.