

982,899.

Patented Jan. 31, 1911.

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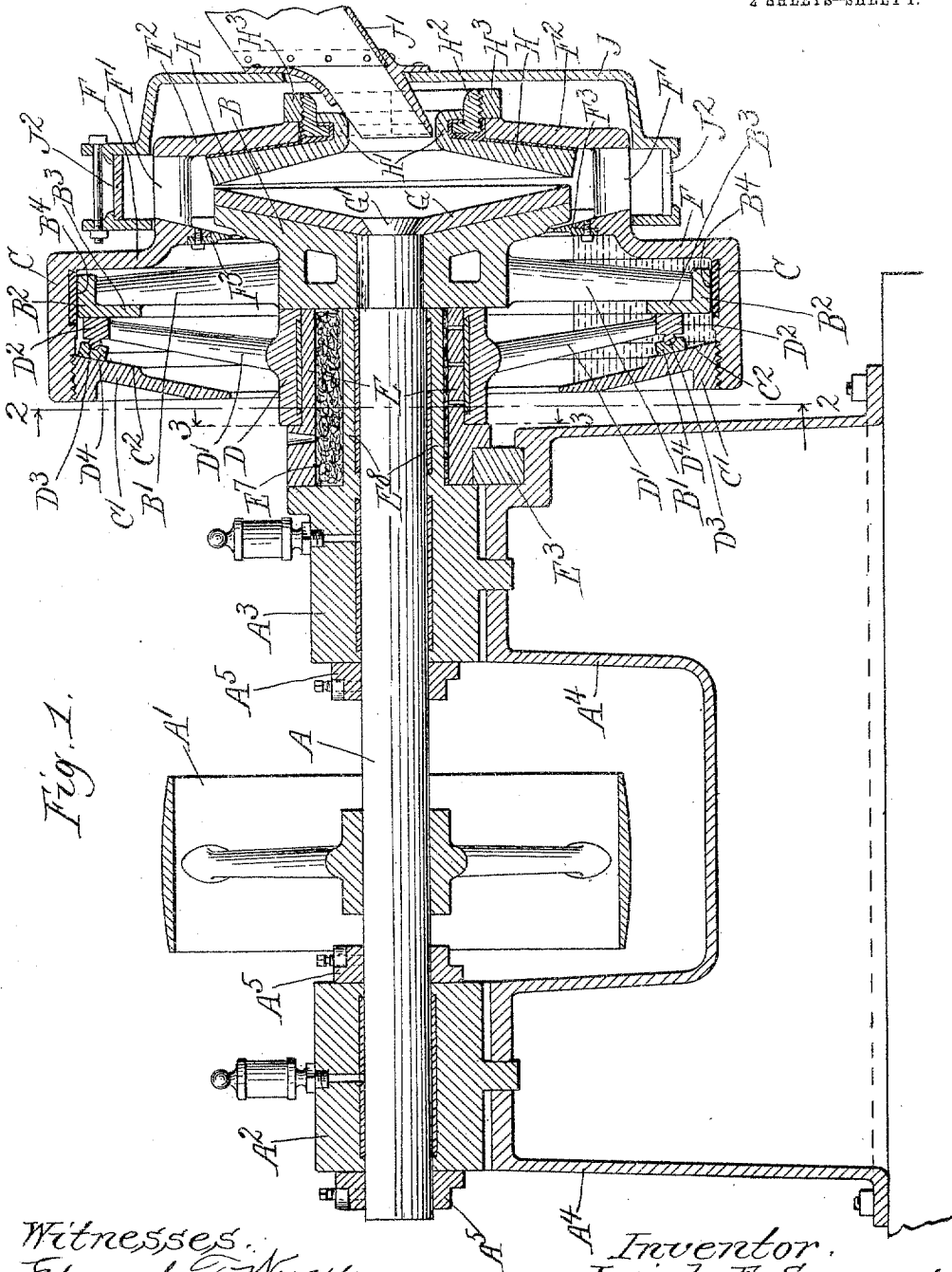


Fig. 1.

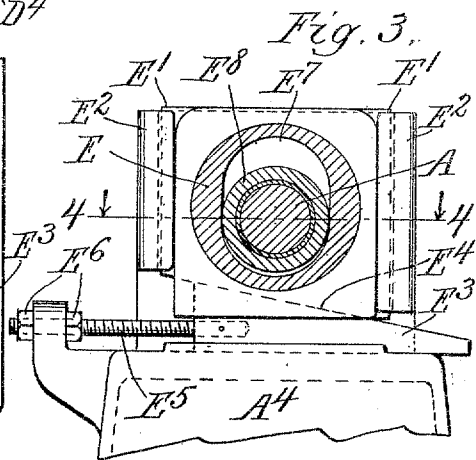
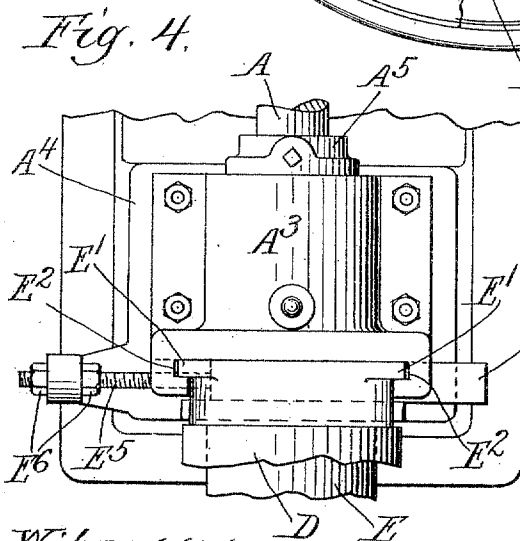
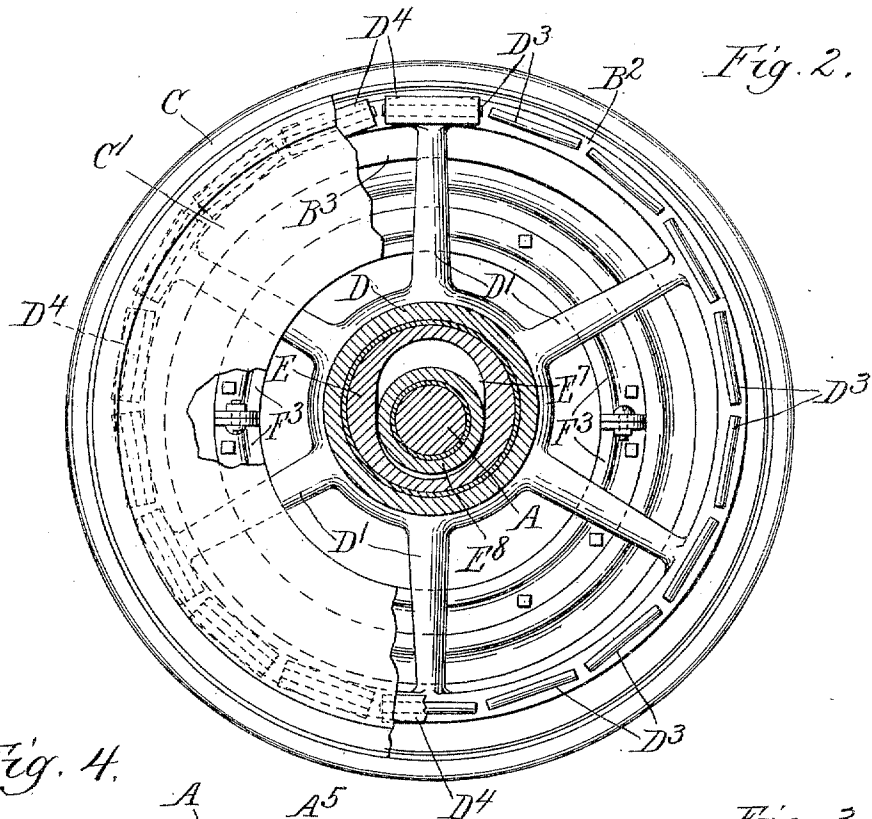
Witnesses.
Edward T. Wray
Minnie M. Lindenau

Inventor,
Josiah E. Symons.
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Attorneys.

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2 SHEETS-SHEET 2.



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UNITED STATES PATENT OFFICE.

JOSIAH E. SYMONS, OF CHICAGO, ILLINOIS.

CRUSHING-MACHINE.

982,899.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed March 21, 1910. Serial No. 550,563.

To all whom it may concern:

Be it known that I, JOSIAH E. SYMONS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Crushing-Machines, of which the following is a specification.

My invention relates to improvements in crushing machines and is illustrated in the accompanying drawings, wherein—

Figure 1 is a section, Fig. 2, a section on line 2—2 of Fig. 1; Fig. 3, a section on line 3—3 of Fig. 1; Fig. 4, a plan view along the line 4—4 of Fig. 3.

Like parts are indicated by like letters in all the figures.

The shaft A carries the pulley A¹ and is mounted in the bearings A², A³, upon the frame A⁴, is held from longitudinal displacement by means of the collars A⁵, and carries at one end the hub B from which radiate the spokes B¹ carrying at their outer extremity the rim of the wheel B² having on one side the downwardly depending flange B³ and provided with the outwardly curved surface B⁴ to engage the flanged ring C. The ring C is threaded to engage the annular disk C¹ which has the conical surface C² at an angle with the surface of the flange B³. The hub D has the radial arms D¹ which support the rim of the eccentric wheel D² with a flat surface adapted to engage the flange B³ and on the other side the tangential projections D³ which carry the blocks D⁴ in opposition with the conical surface C². The hub D is mounted upon the tubular bearing E which engages the bearing A³ at one end and the hub B at the other, and is provided with the lugs E¹ which ride in the channels E² in the bearing A³. The wedge E³ in engagement with the inclined surface E⁴ and actuated by the bolt E⁵ and nuts E⁶ is adapted to move the bearing E in a vertical direction, the elliptical recess E⁷ in said bearing adapted to permit such movement without interfering with the shaft A and bearing collar E⁸. The ring C is provided at one side with the flange F from which projects the lugs F¹ which carry the annular disk F². The vane F³ is attached to the flange F and extends inwardly toward the shaft A to form an oil pocket. The crushing plate G is mounted upon the hub B and held thereto by the centrally lo-

cated screw G¹. The crushing plate H which as well as the plate G is supported by the shaft A is supported by the disk F² and is provided with the centrally located opening which has the grooved and outwardly projecting flange H¹ thereabout. The split collar H² is adapted to engage the groove in the flange H¹ and is threaded to receive the nut H³. When the parts are in this position zinc or other suitable metal is poured into the space between the member H and the disk F² furnishing a backing for said plate and surrounding or entering the spaces between the collar H² and the flange H¹. The nut H³ may then be turned to draw the plate firmly against the zinc backing. The hood J is provided with the chute J¹ adapted to correspond with the centrally located opening in the crushing member H and carries the removable ring J², said ring adapted to extend over the two crushing members.

I have called the wheel D² an eccentric wheel in that it rotates about a center other than that center about which the remainder of the apparatus rotates. The axis of this wheel is in a line at all times parallel with the axis of the machine, which axis, however, may be laterally displaced.

It is evident that while I have shown an operative device in the drawings, yet numerous departures might be made from the design as shown without departing materially from the spirit of my invention.

The use and operation of my device are as follows: I provide a plurality of dish-shaped crushing members G, H, mounted upon a single shaft A, said members held adjustably at an angle one to the other, and rotating at the same velocity. I mount one of these crushing members rigidly upon the driving shaft. The other is supported by said shaft and at an angle thereto. The means for varying said angle is a wheel D² adapted to rotate with the shaft. Said wheel is mounted upon a movable bearing E and a displacement of the center of said wheel away from the center of rotation of the shaft operates by means of a conical surface C² in connection with a supporting collar C for the outer crushing member to vary the angularity of the two crushing members. When the machine is in operation centrifugal force will distribute the oil equally about the periph-

ery of the wheel. I provide, however, a relatively deep channel about said wheel so that when the machine is not in operation the oil may still be contained within such channel. It is necessary in order that binding and heating may not occur, to provide the eccentric wheel with a plurality of bearing blocks D¹ oscillatingly mounted thereon. I provide also a novel means of attaching the crushing member to the supporting plate. The plate is attached to its support at the center instead of at the sides. This is extremely desirable in that it is customary to use manganese steel plates and if the attaching means are at the outside these plates will gradually spread owing to the crushing action of the material being crushed, and finally shear off the attaching means. When, however, the plate is attached at the center no such damage can occur.

I claim:—

1. A crushing machine comprising two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft.

2. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity.

3. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means independent of said shaft.

4. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means operative at a point without the periphery of said crushing members.

5. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means independent of said shaft and operative at a point without the periphery of said crushing members.

6. A crushing machine comprising two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, one of said members rigidly mounted upon the shaft.

7. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, one of said members rigidly mounted upon the shaft, with means for varying their angle of obliquity.

8. In a crushing machine the combination of two opposed rotating crushing members

at an angle one with the other, mounted upon a single shaft, one of said members rigidly mounted upon the shaft, with means for varying their angle of obliquity, said means independent of said shaft.

9. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, one of said members rigidly mounted upon the shaft, with means for varying their angle of obliquity, said means operated at a point without the periphery of said crushing members.

10. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, one of said members rigidly mounted upon the shaft, with means for varying their angle of obliquity, said means independent of said shaft and operative at a point without the periphery of said crushing members.

11. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means including an eccentric wheel.

12. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means independent of said shaft and including an eccentric wheel.

13. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means operative at a point without the periphery of said crushing members and including an eccentric wheel.

14. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means independent of said shaft and operative at a point without the periphery of said crushing members, said means including an eccentric wheel.

15. In a crushing machine, a shaft, a hub rigidly attached to said shaft, a wheel about said hub, a collar supported upon said wheel, said collar adapted to support a crushing surface in opposition to a crushing surface upon said hub.

16. In a crushing machine, a shaft, a hub rigidly attached to said shaft, a wheel about said hub, a collar supported upon said wheel, said collar adapted to support a crushing surface in opposition to a crushing surface upon said hub, and an annular disk engaging said collar, said disk having

a conical surface, and wedging means between said conical surface and the edge of said wheel.

17. In a crushing machine, a shaft, a hub
5 rigidly attached to said shaft, a wheel about said hub, a collar supported upon said wheel, said collar adapted to support a crushing surface in opposition to a crushing surface upon said hub, an annular disk engaging
10 said collar, said disk having a conical surface, and wedging means between said conical surface and the edge of said wheel, said means comprising an eccentric wheel.

18. In a crushing machine, a shaft, a hub
15 rigidly attached to said shaft, a wheel about said hub, a collar supported upon said wheel, said collar adapted to support a crushing surface in opposition to a crushing surface upon said hub, an annular disk engaging
20 said collar, said disk having a conical surface, and wedging means between said conical surface and the edge of said wheel, said means comprising an eccentric wheel, a plurality of blocks upon said wheel adapted to
25 engage said conical surface.

19. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying
30 their angle of obliquity, said means including an eccentric wheel, and means for varying the eccentricity of said wheel.

20. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying
35 their angle of obliquity, said means independent of said shaft and including an eccentric wheel, and means for varying the eccentricity of said wheel.
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21. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying
45 their angle of obliquity, said means operative at a point without the periphery of said crushing members and including an eccentric wheel, and means for varying the eccentricity of said wheel.

22. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying
50 their angle of obliquity, said means independent of said shaft and operative at a point without the periphery of said crushing members, said means including an eccentric wheel, and means for varying the eccentricity of said wheel.
55

23. In a crushing machine, a shaft, a hub
60 rigidly attached to said shaft, a wheel about said hub, a collar supported upon said wheel, said collar adapted to support a crushing surface in opposition to a crushing surface upon said hub, an annular disk engaging
65

said collar, said disk having a conical surface, and wedging means between said conical surface and the edge of said wheel, said means comprising an eccentric wheel, and means for varying the eccentricity of said
70 wheel.

24. In a crushing machine, a shaft, a hub, rigidly attached to said shaft, a wheel about said hub, a collar supported upon said wheel, said collar adapted to support a crushing
75 surface in opposition to a crushing surface upon said hub, an annular disk engaging said collar, said disk having a conical surface, and wedging means between said conical surface and the edge of said wheel, said means comprising an eccentric wheel, a plurality of blocks upon said wheel adapted to engage said conical surface, and means for
80 varying the eccentricity of said wheel.

25. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means including an eccentric wheel, and means for
85 varying the eccentricity of said wheel, said means comprising a bearing for said wheel and a wedge adapted to vertically displace said bearing.
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26. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means independent of said shaft and including an eccentric wheel, and means for varying the eccentricity of said wheel, said means comprising a bearing for said wheel and a wedge adapted to vertically displace said bearing.
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27. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means operative at a point without the periphery of said
100 crushing members and including an eccentric wheel, and means for varying the eccentricity of said wheel, said means comprising a bearing for said wheel and a wedge adapted to vertically displace said bearing.
105

28. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, mounted upon a single shaft, with means for varying their angle of obliquity, said means independent of said shaft and operative at a point without the periphery of said crushing members, said means including an eccentric wheel, and means for varying the eccentricity of said wheel, said means comprising a bearing for said wheel and a wedge adapted to vertically displace said bearing.
110

29. In a crushing machine, a shaft, a hub
115 rigidly attached to said shaft, a wheel about said hub, a collar supported upon said wheel,
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125
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said collar adapted to support a crushing surface in opposition to a crushing surface upon said hub, an annular disk engaging said collar, said disk having a conical surface, and wedging means between said conical surface and the edge of said wheel, said means comprising an eccentric wheel, and means for varying the eccentricity of said wheel, said means comprising a bearing for said wheel and a wedge adapted to vertically displace said bearing.

30. In a crushing machine, a shaft, a hub rigidly attached to said shaft, a wheel about said hub, a collar supported upon said wheel, said collar adapted to support a crushing surface in opposition to a crushing surface upon said hub, an annular disk engaging said collar, said disk having a conical surface, and wedging means between said conical surface and the edge of said wheel, said means comprising an eccentric wheel, a plurality of blocks upon said wheel adapted to engage said conical surface, and means for varying the eccentricity of said wheel, said means comprising a bearing for said wheel and a wedge adapted to vertically displace said bearing.

31. In a crushing machine having two opposed rotating crushing surfaces, means for attaching one of said surfaces to a support, said means comprising a groove about a central opening in said surface.

32. In a crushing machine having two op-

posed rotating crushing surfaces, means for attaching one of said surfaces to a support, said means comprising a groove about a central opening in said surface, a collar adapted to engage said groove and screw-threaded to engage a nut.

33. In a crushing machine having two opposed rotating crushing surfaces, means for attaching one of said surfaces to a support, said means comprising a groove about a central opening in said surface, a collar adapted to engage said groove and screw-threaded to engage a nut, a cast metallic backing between said plate, collar and groove and the support.

34. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, with means for varying their angle of obliquity, said means operative at a point without the periphery of said crushing members.

35. In a crushing machine the combination of two opposed rotating crushing members at an angle one with the other, with means for varying their angle of obliquity, said means operative at a point without the periphery of said crushing members, one of said members rigidly mounted upon the shaft.

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Witnesses:

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