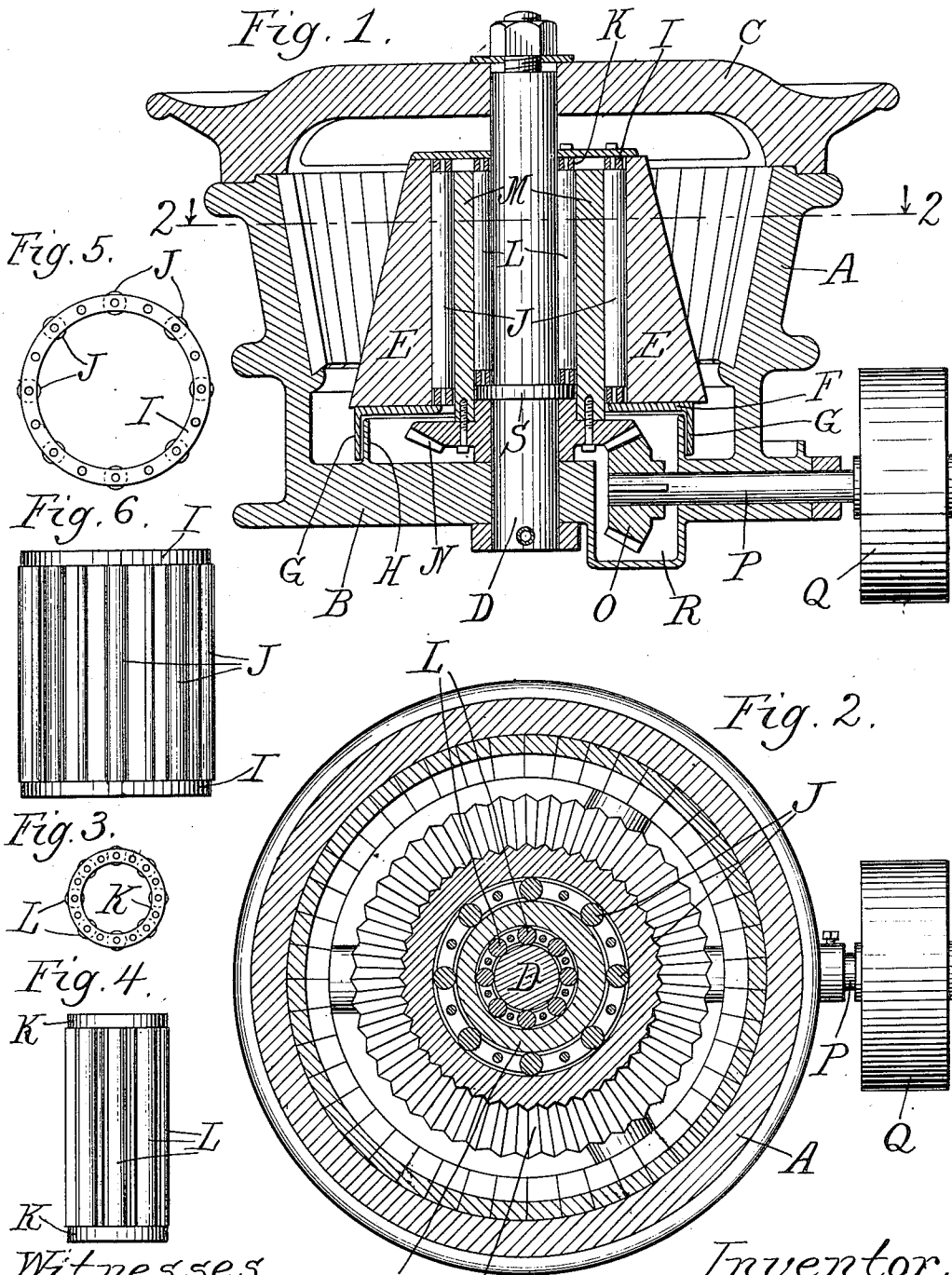


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 STONE CRUSHER.
 APPLICATION FILED MAY 13, 1907.

1,016,904.

Patented Feb. 6, 1912.



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UNITED STATES PATENT OFFICE.

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STONE-CRUSHER.

1,016,904.

Specification of Letters Patent.

Patented Feb. 6, 1912.

Original application filed February 26, 1904, Serial No. 195,459. Divided and this application filed May 13, 1907. Serial No. 373,239.

To all whom it may concern:

Be it known that I, EDGAR B. SYMONS, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Stone-Crushers, of which the following is a specification.

My invention relates to stone crushers and is illustrated in the accompanying drawings wherein—

Figure 1 is a vertical section, Fig. 2 a horizontal section on the line 2—2 of Fig. 1, and Figs. 3, 4, 5 and 6 details of the two inner cases.

Like parts are indicated by the same letter in all the figures.

A is the hopper resting on the base B and surmounted by the spider crown C.

D is a tie-rod which locks the parts together.

E is an inner hollow rotary crusher head mounted about the tie-rod and supported on a plate F, the lower rim G of which incloses a flange H on the base.

I is an outer roller bearing cage having the rollers J, and K in an inner roller bearing cage having the rollers L. Between these two sets of rollers is mounted the eccentric sleeve M which rests at its lower edge on the bevel gear N which is driven by the pinion O on the shaft P, which in turn is driven from the pulley Q.

R is a protected cavity in the base in which the pinion O rotates. The cage K rests on the collar S and the cage I on the support F. The roller bearing cages consist of perforated rings with connecting bars and intermediate rollers.

I have not shown all of the parts including the support and driving mechanism because it seems unnecessary as this particular invention has reference only to the use of the eccentric sleeve.

The use and operation of my invention are as follows: Power being applied, the shaft P rotates and causes the eccentric sleeve to rotate around the fixed center shaft or tie-rod. This sleeve rotates between the two sets of rollers and causes the crusher head E to oscillate within the hopper, the stone being fed through the upper spider crown, falls in between the two crusher plates and as the head oscillates is crushed and broken,

the small particles falling out between the arms of the base.

This application is a divisional application of my original application filed February 26th, 1904, No. 195,459, and embraces one of the species there presented which could not be claimed in that application, but which are described in the application and illustrated particularly in connection with Figs. 9 to 14 inclusive. The broad claims and claims on the other species are retained in the original application.

I claim:

1. In a crushing machine, the combination of an outer crushing shell having a spider arm bottom and a removable crown piece, a centrally located tie-shaft fixed to said bottom and crown piece, a crusher head movable on the shaft and containing a rotating eccentric sleeve and means for rotating said sleeve.

2. In a crushing machine, the combination of an outer crushing shell with a crown piece fitted to said shell, a centrally located fixed shaft supported within such shell by bearings in the crown piece and in the shell, a collar of rollers within the crushing shell surrounding said shaft as a roller bearing, and an eccentric sleeve surrounding said rollers and means for rotating said sleeve.

3. In a crushing machine, the combination of a stationary crushing shell with a centrally located stationary shaft supported by suitable connections to said shell, a roller collar surrounding said shaft and comprising a series of rollers, an eccentric sleeve within the crushing shell surrounding said roller collar, and means for turning said sleeve.

4. In a crushing machine, the combination of a stationary outer crushing shell with a centrally located stationary shaft supported in such shell, an eccentric sleeve within the crushing shell mounted on a roller bearing around said shaft, means for turning such sleeve, and a roller collar comprising a series of rollers surrounding said sleeve and a movable crusher head.

5. In a crushing machine, the combination of a stationary outer crushing shell with a centrally located and substantially vertical stationary shaft held by connections to said shell, an eccentric sleeve within the crushing shell mounted on a roller bearing around

said shaft, a crushing head mounted on a roller bearing surrounding said sleeve, and means for turning said sleeve.

5 6. In a crushing machine, the combination
of an outer crushing shell having radial
armed end pieces with a centrally located
shaft supported by said end pieces, a roller
collar surrounding said shaft, an eccentric
sleeve surrounding said roller collar, a
10 roller collar surrounding said sleeve, a
crushing head surrounding said second col-
lar, and means for turning said sleeve.

15 7. In a crushing machine, the combination
of a hollow crusher head with a cylindrical
device adapted to rotate eccentrically there-
in so as to impart an oscillating movement
thereto, such device comprising two inde-
pendent members one within the other, one
20 of which consists of a roller collar, the other
of an eccentric sleeve, and means for im-
parting rotary motion to the sleeve.

25 8. In a crushing machine, the combination
of a stationary shaft, a hollow crusher head
surrounding said shaft, and three rotatable
devices within each other and all interposed
between the shaft and such crusher head, the
intermediate device being an eccentric sleeve,
and the inner and outer of such devices
30 comprising a plurality of rollers, and rotat-
ing means associated with the middle device
so as to oscillate the crusher.

35 9. In a crushing machine, the combination
of a hollow crusher head having an exterior
crushing surface with a stationary crushing
member, a stationary shaft and a cylindrical
device mounted eccentrically on said shaft
and located within said crushing surface to
impart an oscillating movement to the head,
40 said cylindrical device consisting of an ec-
centric sleeve.

45 10. In a crushing machine, the combina-
tion with a stationary device of two crush-
ing bodies having opposed crushing sur-
faces, one of said bodies being movable, and
oscillating means interposed between the
stationary device and the movable crushing
element for giving the latter an oscillating
movement with respect to the former, sub-
stantially equal at all points therealong, said
50 means containing an eccentric sleeve.

55 11. In a crushing machine, the combina-
tion with a stationary device of two crush-
ing bodies having opposed crushing sur-
faces, one of said bodies being movable, and
an eccentric device interposed between the
stationary device and the movable crushing
element for giving the latter an oscillating
movement with respect to the former, said
60 eccentric device containing an eccentric
sleeve located within the movable crushing
body.

12. In a crushing machine, the combina-
tion of a hopper having an interior crush-

ing surface, with a hollow crusher head
mounted to oscillate in such hopper in op- 65
position to its crushing surface, a fixed shaft,
an eccentric device on said shaft, comprising
anti-friction bearings, located within said
head to effect such oscillating movement,
and an eccentric sleeve. 70

13. In a crushing machine, the combina-
tion of an outer crushing shell, with a hol-
low crushing head, a stationary shaft with-
in said crusher head, and a rotating eccen-
tric sleeve interposed between the shaft and 75
the inner surface of the crusher head and
adapted by its eccentricity to displace the
crusher head in directions at right angles to
the axis of said shaft, and means for reduc-
ing the friction between the eccentric sleeve 80
and the shaft and head between which the
same is interposed.

14. In a crushing machine, the combina-
tion of a hopper to receive the stone to be
crushed, with an interior crushing surface, 85
a hollow crusher head mounted inside the
hopper, and an eccentric device comprising
roller bearings and an eccentric sleeve ro-
tatable within and against said crusher head
adapted to give the crushing head a vibra- 90
tory or oscillating movement to or from the
crushing surface of the hopper.

15. In a crushing machine, the combina-
tion of a stationary crusher head having
apertured bottom and top pieces, with a sta- 95
tionary shaft connecting said bottom and
top pieces, a crusher head within said shell,
and an eccentric within the crusher head to
gyrate the same, said eccentric abutting
against such stationary shaft, and contain- 100
ing with other elements an eccentric sleeve.

16. In a crushing machine, the combina-
tion of an outer crushing shell, with a hol-
low crushing head, a stationary shaft with- 105
in said crusher head, and a rotating eccen-
tric device interposed between the shaft and
the inner surface of the crusher head and
adapted by its eccentricity to displace the
crusher head in directions at right angles to
110 the axis of said shaft, and means for reduc-
ing the friction between the eccentric device
and the shaft and head, between which the
same is interposed.

17. In a crushing machine the combina-
tion of an outer crushing shell, a shaft with- 115
in the shell, a crushing head inclosing the
shaft and within the crushing shell, an ec-
centric sleeve between the shaft and within
the crusher head, and means for rotating it
so as to move the crusher head within the 120
crushing shell.

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Witnesses:

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