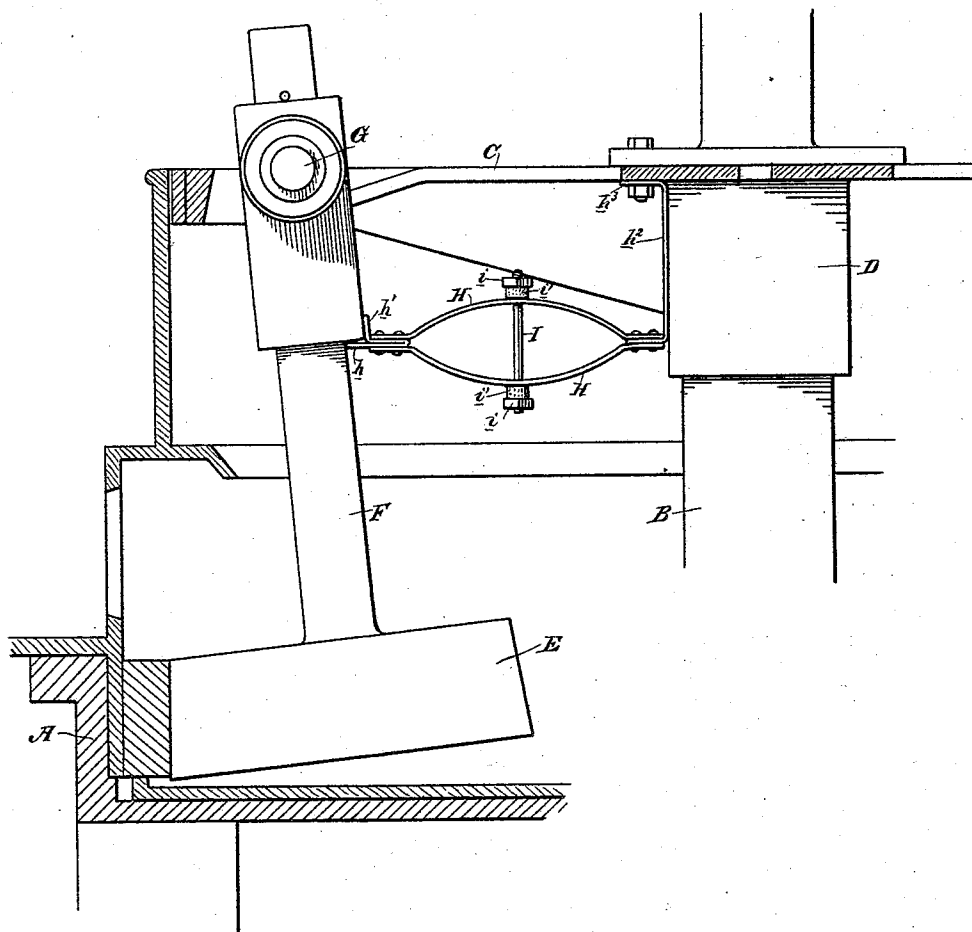


(No Model.)

C. E. PHILES.
CRUSHING MILL.

No. 475,284.

Patented May 17, 1892.



Witnesses,
J. H. Morse
J. F. Aschbeck

Inventor,
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UNITED STATES PATENT OFFICE.

CHARLES E. PHILES, OF STOCKTON, CALIFORNIA, ASSIGNOR OF ONE-HALF TO
JAMES JEROME SMITH, OF SAME PLACE.

CRUSHING-MILL.

SPECIFICATION forming part of Letters Patent No. 475,284, dated May 17, 1892.

Application filed December 1, 1891. Serial No. 413,708. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. PHILES, a citizen of the United States, residing at Stockton, San Joaquin county, State of California, have invented an Improvement in Crushing-Mills; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of crushing-mills in which centrifugally-swinging rollers are employed, said rollers operating in a pan and being pivotally hung from a revolving driver above.

My invention consists in the novel spring acting on the rollers to hold them positively to their work against the ring-die of the pan, as will be hereinafter fully described, and specifically pointed out in the claims.

The object of my invention is to provide a simple and effective spring for this purpose which can be readily applied and easily removed to enable any roller to be taken out, said spring being durable and not liable to injury or deterioration due to the severe jar in the operation of the machine.

Referring to the accompanying drawing for a more complete explanation of my invention, the figure is a section of one side of a crushing-mill, showing one of the rollers in elevation and the attachment of my spring to the roller connection.

A is the pan.

B is the central driving-shaft; C, the driver-frame, having sleeve-hub D.

E are the rollers having shafts F and sleeve-journals G pivotally connected with the driver, said parts constituting the well-known form of centrifugal crushing-mill.

It has been found necessary to increase the efficiency of the machine to apply a spring of some form to hold the rollers positively to their work against the die. These springs yield sufficiently to allow the rollers to pass obstructions, but at the same time assist the centrifugal force in holding them normally to their work. Many of the springs heretofore used have been connected at their inner ends to the central portion of the machine and at their outer ends have borne upon the connections of the rollers. They have been usually flat springs secured in place by suitable

means, but have been open to the objections of being difficult to place, difficult to remove, and subject to crystallization due to the severe jar in the operation of the machine. These objections are all overcome by my peculiar spring, which is as follows: It consists of two leaves or members H H. These are bowed into elliptical shape, as shown, their ends being riveted together. Between their outer ends is a plate forming a lip *h*, extending straight outwardly and another plate forming a lip *h'*, which projects vertically. At their inner ends a plate forming an upright arm *h*² is bolted between them, the top of said arm being bent inwardly, as shown at *h*³. A regulating-bolt I extends between the separated centers of the leaves or members and is provided with nuts *i* on each end, with intervening cushions of rubber *i'*. This spring is placed in the machine by resting its upturned arm *h*² against the sleeve-hub of the driver C and bolting its turned end *h*³ to said driver. Its outer end bears against the roller-suspending devices, its straight lip *h* passing under the lower end of the sleeve-journal, thus holding it in place, while its upturned end *h'* bears against said journal. The tendency of the roller to bear inwardly has a separating tendency upon the members or leaves of the spring, which is resisted by them, thereby holding the roller well to place. The resiliency of the spring is assisted by the cushions, which also tend to prevent crystallization, and the tension of said spring is regulated by the nuts, so that said spring may be adjusted as the rollers and die were. This construction of spring is a durable and effective one. It can be easily placed in position and very readily removed from its bearing on the roller by simply turning it to one side.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a crushing-mill having centrifugally-swinging rollers and a central driving connection therefor, the horizontal springs for holding the rollers outwardly, consisting of the reversely-curved bowed separated leaves or members connected at their inner ends with the driving connection of the rollers and bearing at their outer ends on the suspend-

ing connections thereof, substantially as herein described.

2. In a crushing-mill having centrifugally-swinging rollers and a central driving connection therefor, the horizontal springs for holding the rollers outwardly, consisting of the reversely-bowed separated leaves or members connected at their inner ends with the driving connection of the rollers and bearing at their outer ends on the suspending connections thereof, and the transverse central bolt and nuts for regulating the tension of the spring, substantially as herein described.

3. In a crushing-mill having centrifugally-swinging rollers and a central driving connection therefor, the horizontally-disposed springs for holding the rollers outwardly, consisting of the connected reversely-bowed separated leaves or members connected at their inner ends with the driving connection of the rollers and bearing at their outer ends on the suspended connections thereof, the transverse central bolt having extended ends and nuts on said ends for regulating the tension of the spring, and the cushions on the ends of the bolt between the leaves of said springs and the nuts, substantially as herein described.

4. In a crushing-mill, the roller having the shaft and swinging sleeve-journal and the central drive-shaft and connected driver with sleeve-hub, in combination with the two-part or bowed spring having secured at its inner end the arm bearing on the sleeve-hub and bolted to the driver and at its outer end the straight lip bearing under the sleeve-journal

and the upturned lip bearing against it, substantially as herein described.

5. In a crushing-mill, the roller having the shaft and swinging sleeve-journal and the central drive-shaft and connected driver with sleeve-hub, in combination with the two-part or bowed spring having secured at its inner end the arm bearing against the sleeve-hub and bolted to the driver and at its outer end the straight lip bearing under the sleeve-journal and the upturned lip bearing against it, and the transverse adjusting-bolt, with nuts for regulating the tension of the spring, substantially as herein described.

6. In a crushing-mill, the roller having the shaft and swinging sleeve-journal and the central drive-shaft and connected driver with sleeve-hub, in combination with the two-part or bowed spring having secured at its inner end the arm bearing against the sleeve-hub and bolted to the driver and at its outer end the straight lip bearing under the sleeve-journal and the upturned lip bearing against it, and the transverse adjusting-bolt, with nuts for regulating the tension of the spring, and the cushions on the bolt ends between the spring and the nuts, substantially as herein described.

In witness whereof I have hereunto set my hand.

C. E. PHILES.

Witnesses:

F. F. CARNDUFF,
W. O. CASTLE.