

Nov. 29, 1932.

C. NIELSEN
HAMMER MILL

1,889,129

Filed Nov. 28, 1930

2 Sheets-Sheet 1

Fig. 1

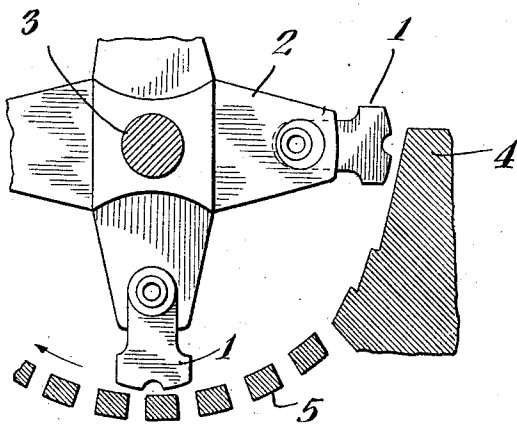
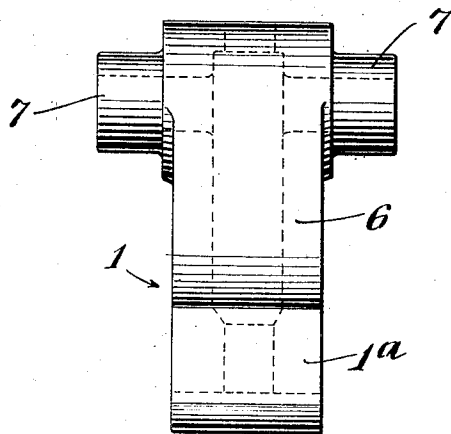


Fig. 2



Inventor
Christian Nielsen
By his Attorneys
Redding, Greeley, Olsen & Campbell

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Fig. 3

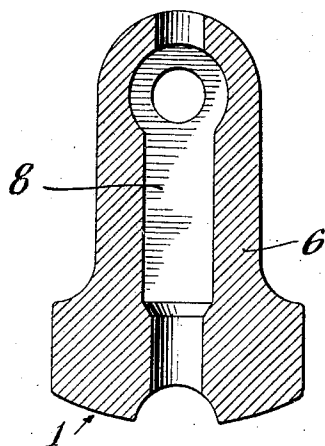
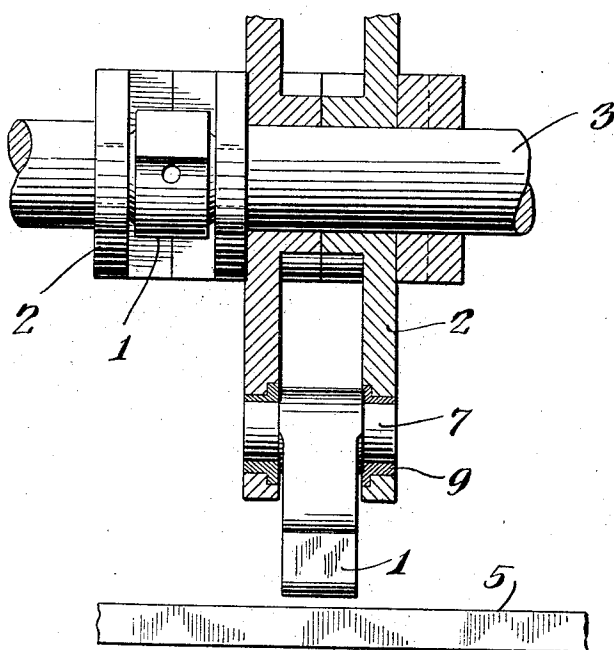


Fig. 4



Inventor

Christian Nielsen
By his Attorneys
Redding, Greely, Shea & Campbell

UNITED STATES PATENT OFFICE

CHRISTIAN NIELSEN, OF COPENHAGEN, DENMARK, ASSIGNOR TO F. L. SMIDTH & CO., OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

HAMMER MILL

Application filed November 28, 1930, Serial No. 498,617, and in Great Britain May 15, 1930.

This invention relates to mills adapted for the crushing or pulverizing of ores, cement raw materials and the like and especially to mills of the type known as hammer mills.

5 In the usual type of hammer mills as used for crushing limestone, shale, ore and other materials, the hammers, as is well known, are arranged about a rapidly rotating shaft and revolve with it with their working faces in operative relation with an anvil or grate and the hammer action of the mill and also its capability of operating upon large pieces of rock or the like increase with the weight of the hammers. In order to provide for the use of hammers of sufficient weight it has been necessary, in the case of hammer mills of large output and which have to operate upon large pieces of material, to increase the volume of the hammers to such an extent that it has been difficult to produce such large hammers by forging, it being impossible to forge the material of the hammer throughout and difficult to harden the hammers satisfactorily. Difficulties also occur when the hammers are cast, as segregation and the formation of blow holes are liable to occur in the interior of heavy castings. A further serious drawback is the loss in material which is caused by the frequent replacement of the hammers which have been worn to such an extent as to be no longer suitable for efficient operation and have to be discarded.

It is the object of the present invention to obviate the difficulties above referred to.

35 In accordance with the invention the hammers are formed as hollow castings, and by casting the hammers with sufficiently large cavities the formation of blow holes in the material is avoided and the mass can be thoroughly hardened. The cavity of the casting is of greatest volume adjacent the point of suspension of the hammers so as to reduce the waste of material when worn hammers have to be replaced. A further economy in material is obtained in that the hammers are so supported as to be capable of being moved towards their grinding surface when they have been worn and for this purpose they are mounted on eccentric bushings. By this arrangement the hammering action is in-

creased while the solid material of the hammers can be utilized to a greater extent before it is necessary to change them.

The invention will now be described with reference to the accompanying drawings, 55 wherein:—

Figure 1 shows a cross section of a portion of a hammer mill.

Figure 2 is a side view of one of the hammers. 60

Figure 3 is a sectional view of a hammer, and

Figure 4 is a detail view, partly in section, showing the formation and support of one of the hammers of a mill, a portion of the supporting and actuating shaft being shown in elevation. 65

As will be seen from the drawings, and more particularly from Figures 1 and 4, the hammers 1 are pivotally hung in arms 2 70 keyed to the rotary shaft 3 of the mill. During the rotation of the shaft 3 and the revolution of the hammers 1 the material is crushed partly against an anvil 4 and partly against grate bars 5. Each hammer, as shown in Figures 2 and 3, consists of a substantially large hammer head 1^a and a shaft 6. The shaft 6 is provided with studs 7 so that the hammer may be mounted pivotally in the arms 2 and preferably in eccentric bushes 9 80 in the arms 2.

In accordance with the invention, the hammers are made hollow, as indicated at 8, such hollowing of the hammer making it possible to produce a hammer which will have the greatest possible hammering action with the smallest possible amount of material. As will be seen in Figure 3, the cavity 8 is axially longitudinal with respect to the hammer 90 and is larger in the shaft 6 than in the head of the hammer and is open at each end through suitable passages. As will be seen in Figure 4, the pivots 7 of the hammer 1 are mounted in eccentric bushings 9 supported in the arms 2. These eccentric bushings are capable of adjustment so that as the hammers are worn they may be approached towards the anvil 4 and the grate bars 5 and consequently may have a longer useful life. 100

I claim as my invention:

A hammer mill having a pivotally mounted and axially elongated hammer supported about a rotary shaft, the hammer having a shank portion and a head larger than the shank portion, each hammer having an axially longitudinal cavity with its volume larger in the shank of the hammer than in the head of the hammer and adjacent the point of suspension of the hammer, the cavity being open at each end.

This specification signed this 12th day of November, A. D. 1930.

CHRISTIAN NIELSEN.