

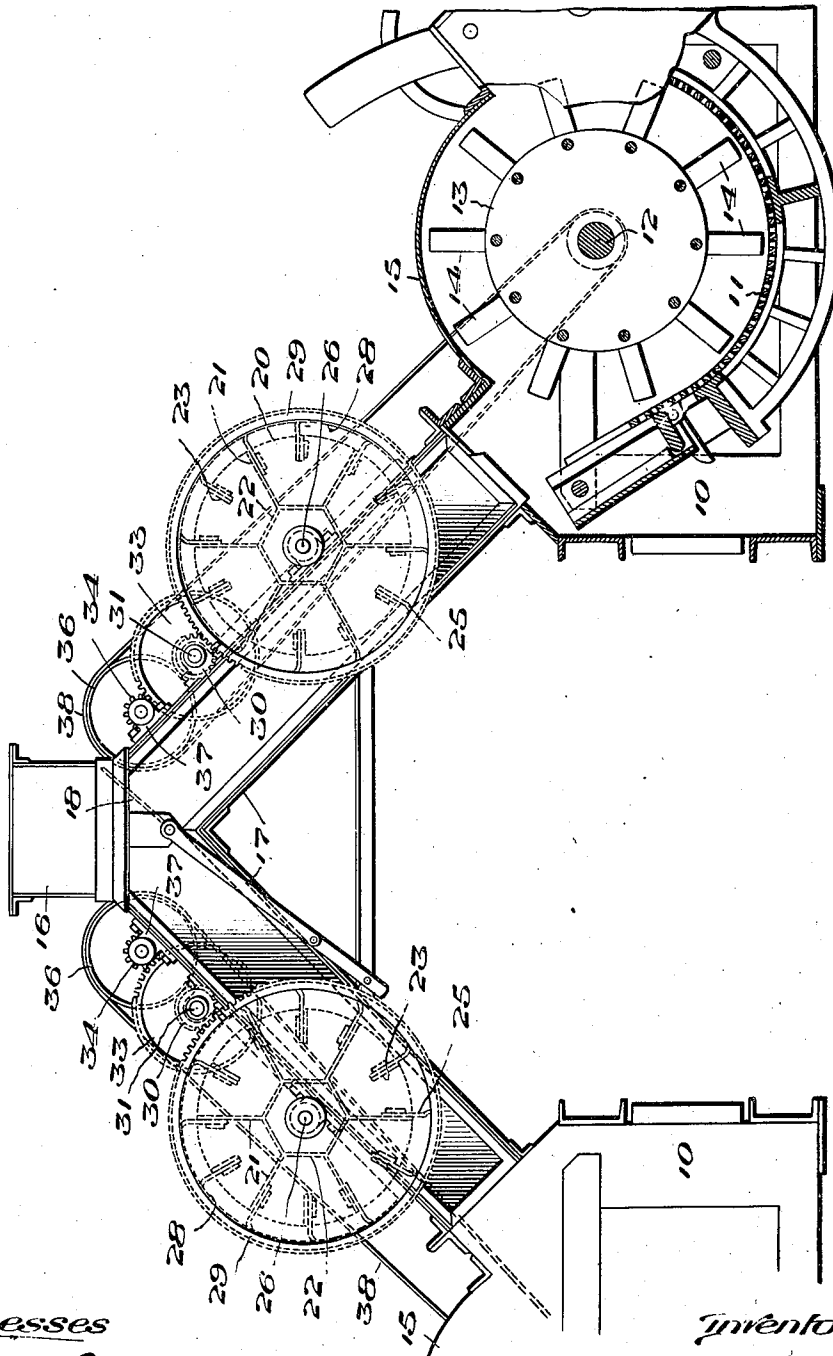
J. L. HILLER.
RETARDER FEEDER FOR CRUSHING MACHINES.
APPLICATION FILED MAR. 14, 1917.

1,407,330.

Patented Feb. 21, 1922.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

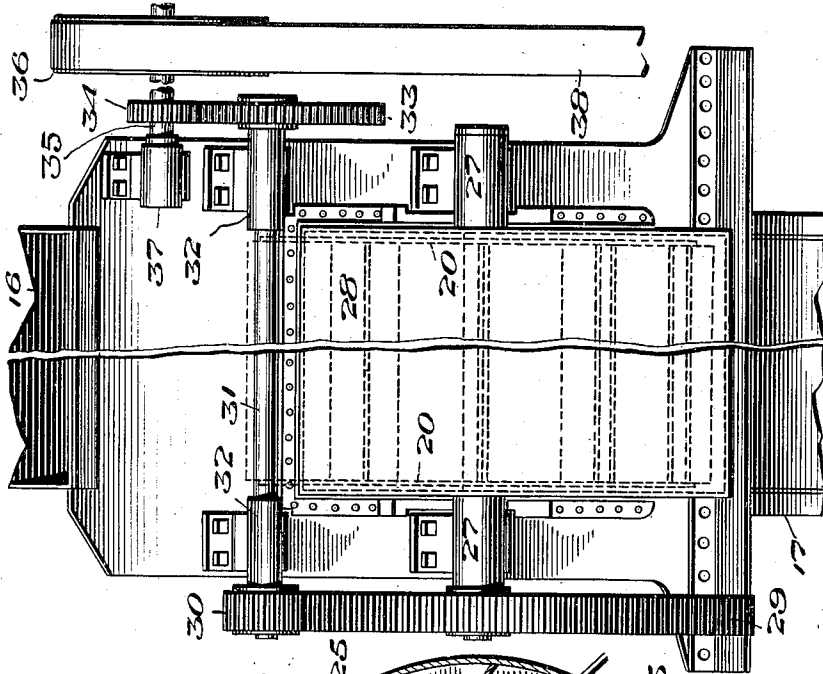
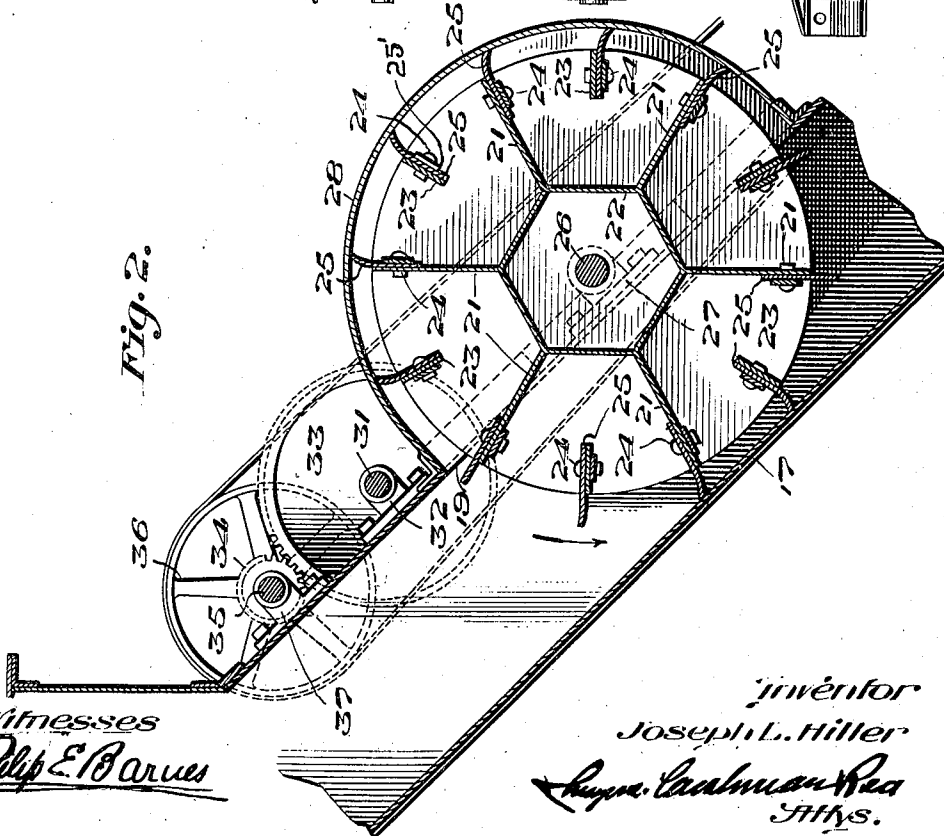


Fig. 2.



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RETARDER FEEDER FOR CRUSHING MACHINES.

1,407,330.

Specification of Letters Patent. Patented Feb. 21, 1922.

Application filed March 14, 1917. Serial No. 154,739.

To all whom it may concern:

Be it known that I, JOSEPH L. HILLER, a citizen of the United States, residing at Mattapoisett, in the county of Plymouth and State of Massachusetts, have invented new and useful Improvements in Retarder Feeders for Crushing Machines, of which the following is a specification.

This invention relates to crushing or pulverizing machines, and has particular reference to that type of crushing machine having a plurality of hammers or beaters adapted to rotate at a relatively high velocity and impinge at their free ends upon the material to be crushed.

The materials to be crushed, such as coal, ores, and the like, are usually fed into the crushing machine by means of a chute, and in those cases where the material is dropped into a vertical chute, or a chute set at a steep angle, or where the material is fed by means of a device, such as a belt conveyor, which imparts motion to the material, the materials, due to force of gravity, pass through the chute at a relatively high rate of speed and issue into the crusher with considerable velocity. The result is that, since the material is fed into the casing of the crusher in the same general direction as that in which the hammers which are to impinge upon the same are rotating, the hammers will so strike the rapidly moving material as to cause a portion of the same to continue its movement and move with the hammers within the casing. Due to centrifugal force, the material picked up by the hammers will bear with considerable pressure against the casing and tend to retard the motion of the hammers.

It is one of the objects of this invention to overcome the above-noted disadvantages, and for this purpose, I provide the delivery chute with means for retarding the flow of the material through the chute and assuring that the material is fed into the crushing machine at slow rate of speed. By causing the material to flow into the crusher at as low a speed as possible, the blows of the hammers upon the material are more effective, a greater amount of material may be crushed, and the crusher will operate at a maximum efficiency.

Another object of the invention is to provide means in the chute for distributing the material uniformly to the beaters of the crushing machine.

A still further object of the invention is to utilize the power developed by retarding the speed of the moving material, and for this purpose the retarding means is connected up to the crusher shaft to which the rotating hammers are secured.

The above and other objects of my invention are obtained in the structure described in the following specification and illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevational view of a crushing plant and illustrates my improved retarder applied to the chutes leading to the crushing machines.

Figure 2 is a longitudinal sectional view through my improved retarder and a chute to which it is applied.

Figure 3 is a top plan view through the structure shown in Figure 1.

Referring to the drawings, wherein like numerals represent like parts in the several views, 10 designates a crushing or pulverizing machine which may be of any suitable construction that shown in the drawings being disclosed more or less conventionally, as the specific construction thereof forms no part of this invention. In the present instance, I have illustrated the crushing machine as having a casing 15 provided with a screen or grate section 11 against which the material is crushed. Extending through the casing is a crusher shaft 12 to which is fixed a plurality of carrier disks 13, and to these disks, hammers or beaters 14 are pivotally mounted.

It is to be understood that the crusher shaft, as is usual in machines of this type, is driven from an external source of power, the latter not being shown in the drawings as it forms no part of my invention.

In Figure 1, I have shown, for illustrative purposes only, two crushing machines of the type just described, and leading to each of these machines, from a single hopper 16, is an inclined delivery chute 17. A gate 18 may be located immediately beneath the hopper 16 for directing the material into either or both of the chutes as desired.

Each of the inclined chutes 17, preferably, adjacent its lower end, is provided in its upper wall with an opening 19 in which is mounted my improved retarder, this retarder being illustrated as being somewhat similar in structure to a paddle wheel.

The retarder or paddle wheel comprises a pair of end members 20 between which are secured blades 21 extending radially from a central polyhedral portion 22 to the periphery of the end portions. Intermediate the blades 21 and connected at their opposite ends to the end portions 20 are blades 23 of less depth than the blades 21. The paddle wheel is adapted to rotate in the direction indicated by the arrow shown in Figure 2, and to the rear sides of the blade are secured strips 25 of rubber or rubber composition, such as is used for conveyor or driving belts, and against these strips the material flowing down the chute is adapted to impinge. The strips 25 are held in place by steel bars 25' and bolts 24 in such a way that the rubber strips may yield in case some hard substance passes down the chute. The strips 25, when they become worn, may be readily reversed and later replaced with new ones.

The retarder or paddle wheel is fixed to a shaft 26 mounted in bearings 27 located on either side of the opening 19. The wheel is of such width that it will fit in between the side walls of the chute. The outer edges of the strips 25 protrude beyond the edges of the blades of the wheel so that they will wipe the bottom of the chute and the inner surface of the cover 28, and by this construction, the passage of dust from the crushing machine up the chute is prevented. 28 designates a semi-cylindrical cover adapted to house the upper portion of the wheel and to close the opening 19.

The retarder or paddle wheel is positively driven at a definite speed, and for this purpose any suitable driving mechanism may be employed. Preferably, the paddle wheel is connected up to the crusher shaft 12 so that the power resulting from the impingement of the material to be crushed upon the blades of the paddle wheel is transmitted to the shaft of the crushing machine and assists the external source of power in pulverizing the coal or other material. In the present instance, I have shown the paddle wheel shaft 26 as having fixed on one end thereof a large gear 29 meshing with the pinion 30 fixed to a shaft 31 extending transversely of the chute 17 and mounted in bearings 32. On the opposite end of the shaft 31 is a gear 33 meshing with a pinion 34 mounted on a shaft 35 which carries a relatively large pulley 36. The shaft 35 has one end mounted in a bearing 37 secured to the top of the chute, and its other end is supported by a bearing (not shown) located to one side of the chute. The pulley is connected up to the crusher shaft

12 by means of a belt 38 as is clearly shown in Figure 1.

The operation of my improved retarder will be readily understood from the foregoing description. The material to be crushed is fed into the hopper 16 by any suitable means and passes into one or both of the chutes 17 depending upon the position of the gate 18. The chutes 17 are inclined, and if it were not for the feeder drum or retarder, the material would be discharged into the crushing machines with a high speed resulting in the disadvantages heretofore noted. With my arrangement, however, the paddle wheel is positively driven at such a rate of speed that the velocity of the blades is less than the speed of the material moving down the chute, and, therefore, the material will impinge upon the blades, and movement towards the crusher is retarded. The distance between the paddle wheel and the crusher is slight so that the material is fed at a relatively low speed into the crushing machine.

My improved retarder also serves the purpose of distributing the material passing down the chute transversely thereof, so that the material is fed uniformly to the crushing hammers.

It is to be noted that the main object of the retarder or paddle wheel is to control the speed and not necessarily the quantity of the material which is fed into the casing of the crusher. The capacity of the retarder may correspond to the capacity of the crusher, but, preferably, the capacity of the retarder is such that it will successfully handle a greater quantity of material than would ever be fed to the pulverizer or crushing machine, so that when the material is fed to the chute, in which the retarder is located from some other machine, such as a breaker, the irregularities of the feed will not choke the feeding chute, the retarder, or the pulverizer. The retarder is primarily for the purpose of controlling the speed at which the material is delivered to the crusher and does not serve the purpose of measuring the amount of material fed to the crusher. The amount of material fed to the crusher is determined by the quantity of material which is fed to the upper end of the chute or the hopper 16. The material fed to the chute will not collect in the upper end thereof for the retarder does not stop the movement of the material but merely changes the rate of movement.

It is to be noted that the paddle wheel is belted up to the crusher shaft so that the power generated by the material impinging upon the blades of the paddle wheel is utilized in driving the crusher and pulverizing the material to be crushed.

This invention is susceptible of various other modifications and changes which would

be within the spirit of my invention without departing from the scope of the following claims.

What I claim is:—

5 1. The combination in a machine of the class described, of a rotary reducing element, an inclined feed trough or chute leading thereto, a material retarding element located in the path of travel of the material
10 in said trough or chute, and speed reducing operating means connected to said rotary reducing and material retarding elements to effect their operation in unison and move the retarding element at a less speed
15 than the reducing element, substantially as described.

20 2. The combination, in a machine of the class described, of a rotary pulverizing element with an inclined feed trough or chute leading thereto, a material retarding element located above said chute and having a blade adapted to operate in the path of material flowing therethrough, and a train of speed reducing operating means connected to said

rotary reducing and retarding elements so 25 that they operate in unison, and the retarding element at a less speed than the pulverizer, substantially as described.

3. The combination, in a machine of the class described, a rotary reducing device, an 30 inclined feed chute leading the material to be reduced to said reducing device, a rotary retarding device mounted above said chute and having spaced blades adapted to operate in said chute and in the path of travel of the 35 material flowing therethrough and a train of speed reducing operating means connecting said reducing and retarding devices, whereby said retarding device normally rotates at a less speed than the reducing device, sub- 40 stantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOSEPH L. HILLER.

Witnesses:

ROBERT T. AIDAN,

ENRIQUE R. CARMOECA.