Nov. 8, 1927.

1,648,625

H. J. SHELTON

CRUSHER AND PULVERIZER

Filed Feb. 11, 1927

2 Sheets-Sheet 1

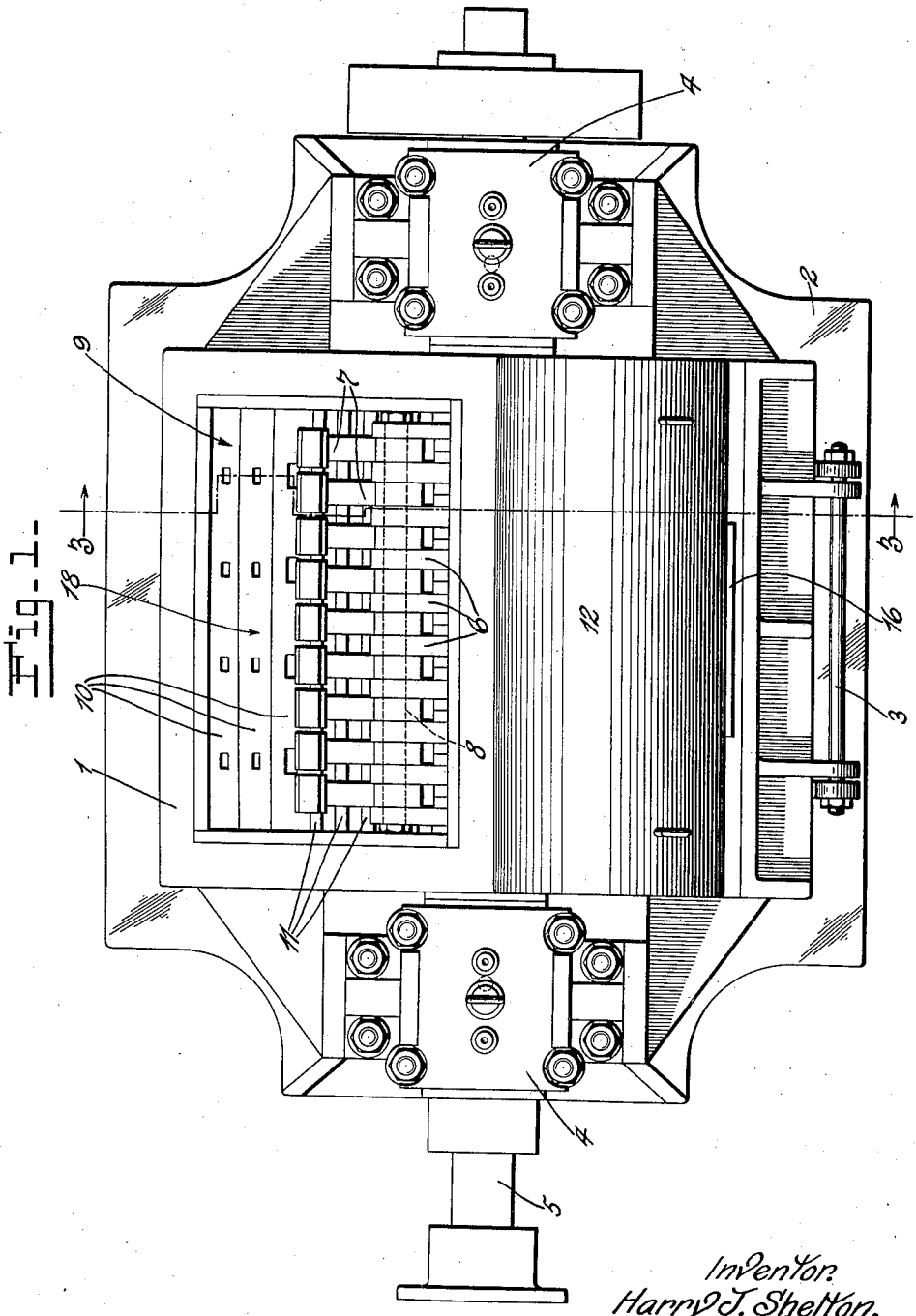


Fig. 1.

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Fig. 2.

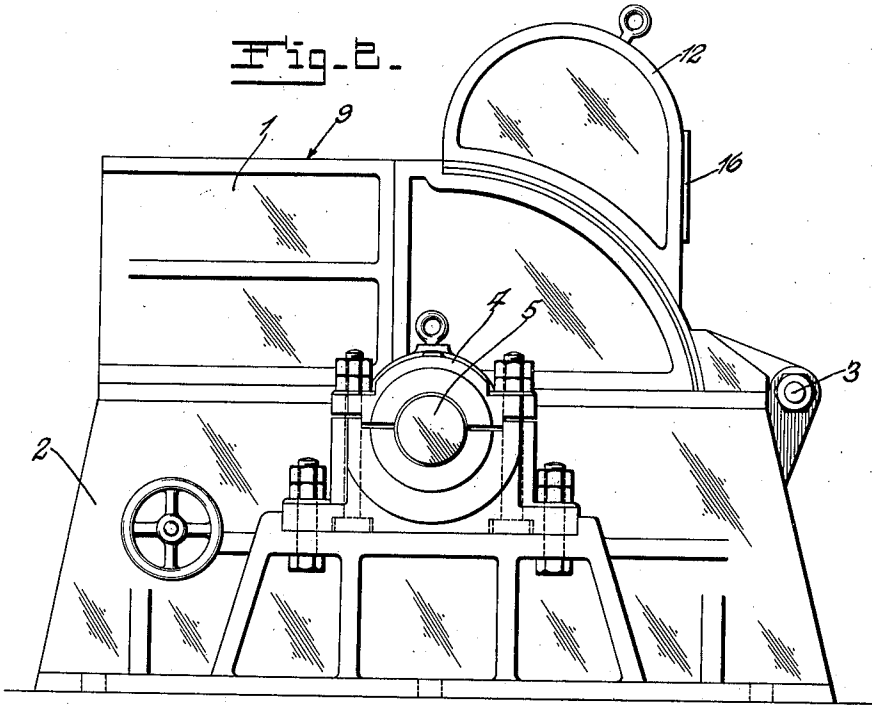
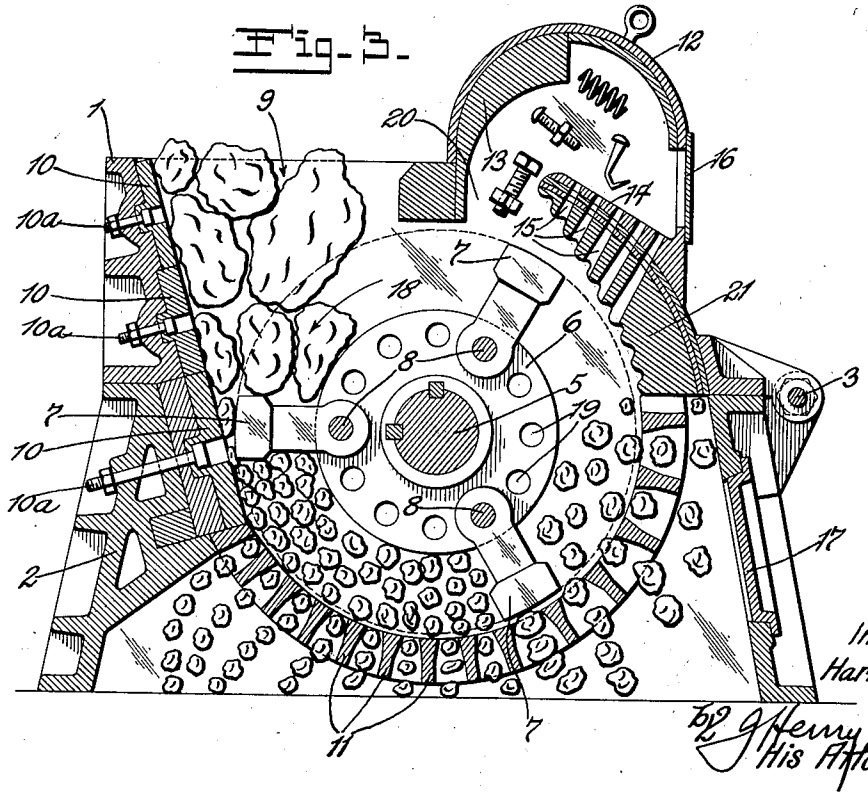


Fig. 3.



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Patented Nov. 8, 1927. 1,648,625

UNITED STATES PATENT OFFICE.

HARRY J. SHELTON, OF ST. LOUIS, MISSOURI.

CRUSHER AND PULVERIZER.

Application filed February 11, 1927. Serial No. 167,441.

My invention relates to crushers and pulverizers and more particularly to crushers and pulverizers having a pulverizing chamber with a plurality of revolvable hammers mounted therein.

In the material to be reduced in machines of this type there are often many foreign objects such as pieces of metal of various shapes and sizes which, of course, cannot be broken up or disintegrated by the action of the hammers and which sometimes are too large to be passed outwardly through the openings in the circumferential wall of the pulverizing chamber and, consequently, unless some provision is made for removing them they are carried around in the pulverizing chamber by the hammers and often do much damage to the machine. Such expedients as have been resorted to in attempting to provide means for removing the foreign objects from the pulverizing chamber have been ineffective either in not allowing the foreign objects to pass from the pulverizing chamber or if they allow the foreign objects to pass out they also allow much of the material to be reduced to pass from the pulverizing chamber with them.

The objects of my invention are to provide a crusher and pulverizer having a pocket therein to receive and retain foreign objects removed from the material to be reduced and to provide means for returning to the pulverizing chamber any reduced material which may enter the pocket with the foreign objects.

One embodiment of my invention is fully shown in the accompanying drawings wherein similar letters are used to designate similar parts: Fig. 1 is a top view of the crusher and pulverizer; Fig. 2 is an elevation of the machine and Fig. 3 is a section along the lines 3—3 in Fig. 1.

Referring now to the figures the crusher and pulverizer shown therein as embodying my invention has a housing consisting of an upper section 1 hingedly attached along one side thereof by the pintle 3 to a lower section 2. The sections 1 and 2 of the housing are formed so as to provide a pulverizing chamber 18 in the housing. Bearings 4 are provided at the ends of the housing outside of the pulverizing chamber 18 and carry a shaft 5 which extends longitudinally through the pulverizing chamber. Fixed on that portion of the shaft 5 which is in the pulverizing chamber are a plurality of disks 6 which have perforations 19 arranged therethrough, preferably, aligned substantially at equal distances from the center of the shaft 5. A set of hammers 7 is mounted between adjacent disks on rods 8 which pass through perforations 19, as shown in Fig. 3. The housing has an inlet 9 to the pulverizing chamber, preferably, extending along one side thereof, as shown in Fig. 1. Breaker plates 10 are mounted on the outer wall of the inlet 9 by means of bolts 10^a extending through the wall of the housing, as shown and, preferably, having the heads thereof positioned in the counter-sinks in the plates 10. The lower circumferential wall of the pulverizing chamber, in this embodiment of my invention, is formed by a plurality of grate bars 11 which may be spaced apart varying distances, as shown in Fig. 3, for the purpose more fully hereinafter set forth. A pocket 12 is arranged along the opposite side of the housing from the inlet 9 and has an opening 20 thereinto positioned above the line of motion of the tips of the hammers 7 and separate and distinct from the inlet 9, as indicated by the broken line in Fig. 3. The pocket 12 has the wall 13 forming the far side of said opening 20 and extending downwardly to a point close to the line of motion of the tips of the hammers 7 to separate the pocket 12 and more particularly the opening 20 from the inlet 9, and for other purposes more fully hereinafter set forth. The surface of the wall 13 facing the interior of the pocket 12 is preferably arcuate in shape, as shown. In this form of crusher and pulverizer embodying my invention the bottom wall 14 of the pocket 12 is contiguous with a portion 21 of the upper circumferential wall of the pulverizing chamber 18 and these walls have passages 15 extending therethrough from the interior of the pocket 12 into the pulverizing chamber. A door 16 may be provided in the outside wall of the pocket 12 whereby foreign objects collected in the pocket as hereinafter set forth may be removed therefrom. Likewise, a lower clean-out door 17 may be provided to allow access to the space under the grate bars 11.

The mode of operation of the device illustrated in the drawings and described above, is as follows:—

The shaft 5 is revolved, preferably, so that the hammers 7 move in the direction indicated by the arrow in Fig. 3, downwardly

from the inlet 9 and upwardly towards the opening 20 into the pocket 12. The material to be reduced is fed into the machine through the inlet 9 and enters the pulverizing chamber where it is acted upon by the hammers 7. If the grate bars 11 are spaced as shown, the finer particles will be discharged from the pulverizing chamber through the spaces between the grate bars forming the lower circumferential wall thereof at a point nearest the inlet 9 and the larger particles of the material will be discharged through the spaces farthest from the inlet. Any foreign objects such as pieces of metal or other material which cannot be broken up or disintegrated by the hammers 7 and consequently cannot be reduced to be passed through the spaces between the grate bars in the lower circumferential wall of the pulverizing chamber will be carried around and upwardly by the hammers 7. When they reach the portion 21 of the upper circumferential wall of the pulverizing chamber, which portion preferably curves away, as shown, from the line of motion of the tips of the hammers, the foreign objects will be thrown off at a tangent by centrifugal force and will be thrown against the wall 13 and by it be deflected into the pocket. I prefer, as stated above, that the wall 13 extend downwardly to a point close to the line of motion of the tips of the hammers so that few or none of the foreign objects will be thrown past the wall and into or through the inlet 9. Any small particles of reduced material which find their way into the pocket with the foreign objects may return to the pulverizing chamber through the passages 15. These passages 15 may be varied in size and shape according to the kind of material being reduced.

It may be readily seen that my invention is adaptable to machines using other types of hammers, such as ring hammers, and also to machines wherein the lower circumferential wall of the pulverizing chamber is formed by a perforated plate. For instance, if a machine embodying my invention is designed to break up sand molds in foundries the passages 15 would be comparatively small because the foreign objects would be small bits of metal and the sand when broken up would be small enough to return to the pulverizing chamber through a small passage.

Further, the exact details of construction of the machine may be varied within wide limits without deviating from the spirit of my invention as embodied in the claims below.

What I claim as new and desire to secure by Letters Patent, is:—

1. A crusher and pulverizer comprising a housing having a pulverizing chamber with revolvable hammers mounted therein, said housing having a pocket with an opening thereinto from said pulverizing chamber positioned above the line of motion of the tips of said hammers and said pocket being otherwise adapted and arranged to receive foreign objects removed from the material to be reduced, and a wall of said pocket being contiguous with the upper circumferential wall of said pulverizing chamber, said walls having passages therethrough whereby any reduced material thrown into said pocket with said foreign objects may return to said pulverizing chamber.

2. A crusher and pulverizer comprising a housing having a pulverizing chamber with revolvable hammers mounted therein, said housing having a pocket with an opening thereinto from said pulverizing chamber and arranged to receive foreign objects removed from the material to be reduced, and the circumferential wall of said pulverizing chamber being curved away from the line of motion of the tips of said hammers in front of said opening.

3. A crusher and pulverizer comprising a housing having a pulverizing chamber with revolvable hammers mounted therein, said housing having a pocket with an opening thereinto from said pulverizing chamber and arranged to receive foreign objects removed from the material to be reduced, said housing having a wall arranged to deflect said foreign objects into said pocket, the circumferential wall of said pulverizing chamber being curved away from the line of motion of the tips of said hammers in front of said opening, and said wall having passages therethrough whereby reduced material thrown into said pocket with said foreign objects may be returned to said pulverizing chamber.

4. A crusher and pulverizer comprising a housing having a pulverizing chamber with revolvable hammers mounted therein, said housing having an inlet to said pulverizing chamber extending along one side thereof and said housing also having a pocket arranged along the other side thereof, said pocket having an opening thereinto from said pulverizing chamber above the line of motion of the tips of said hammers, said hammers being arranged to revolve so as to move downwardly away from said inlet and upwardly towards said opening into said pocket, a wall extending downwardly between said inlet and said opening and positioned and arranged whereby foreign objects removed from the material to be reduced will when thrown outwardly by said hammers strike against said wall and be deflected into said pocket, the upper circumferential wall of said pulverizing chamber being curved away from said line of motion of the tips of said hammers in front of said opening, and the lower wall of said pocket hav-

ing passages therethrough leading into said pulverizing chamber whereby reduced material thrown into said pocket with said foreign objects may be returned to said pulverizing chamber.

5. A crusher and pulverizer comprising a housing having a pulverizing chamber with revolvable hammers mounted therein, said housing having an inlet to said pulverizing chamber extending along one side thereof and said housing also having a pocket arranged along the other side thereof, said pocket having an opening thereinto from said pulverizing chamber separate and distinct from said inlet to said pulverizing chamber, a wall extending downwardly between said inlet and said opening to a point close to the line of motion of the tips of said hammers, and said wall being constructed and arranged whereby foreign objects removed from the material to be reduced will when thrown outwardly by said hammers strike against said wall and be deflected into said pocket.

6. A crusher and pulverizer comprising a housing having a pulverizing chamber with revolvable hammers mounted therein, said housing having an inlet to said pulverizing chamber extending along one side thereof and said housing having also a pocket arranged along the other side thereof, said pocket having an opening thereinto from said pulverizing chamber separate and distinct from said inlet to said pulverizing chamber, said hammers being arranged to revolve so as to move downwardly away from said inlet and upwardly towards said opening, and an arcuate shaped wall positioned between said inlet and said opening whereby foreign objects removed from the material to be reduced will when thrown outwardly by said hammers strike against said wall and be deflected rearwardly into said pocket.

In witness whereof I have signed my name to the foregoing specification.

HARRY J. SHELTON.