

No. 680,650.

Patented Aug. 13, 1901.

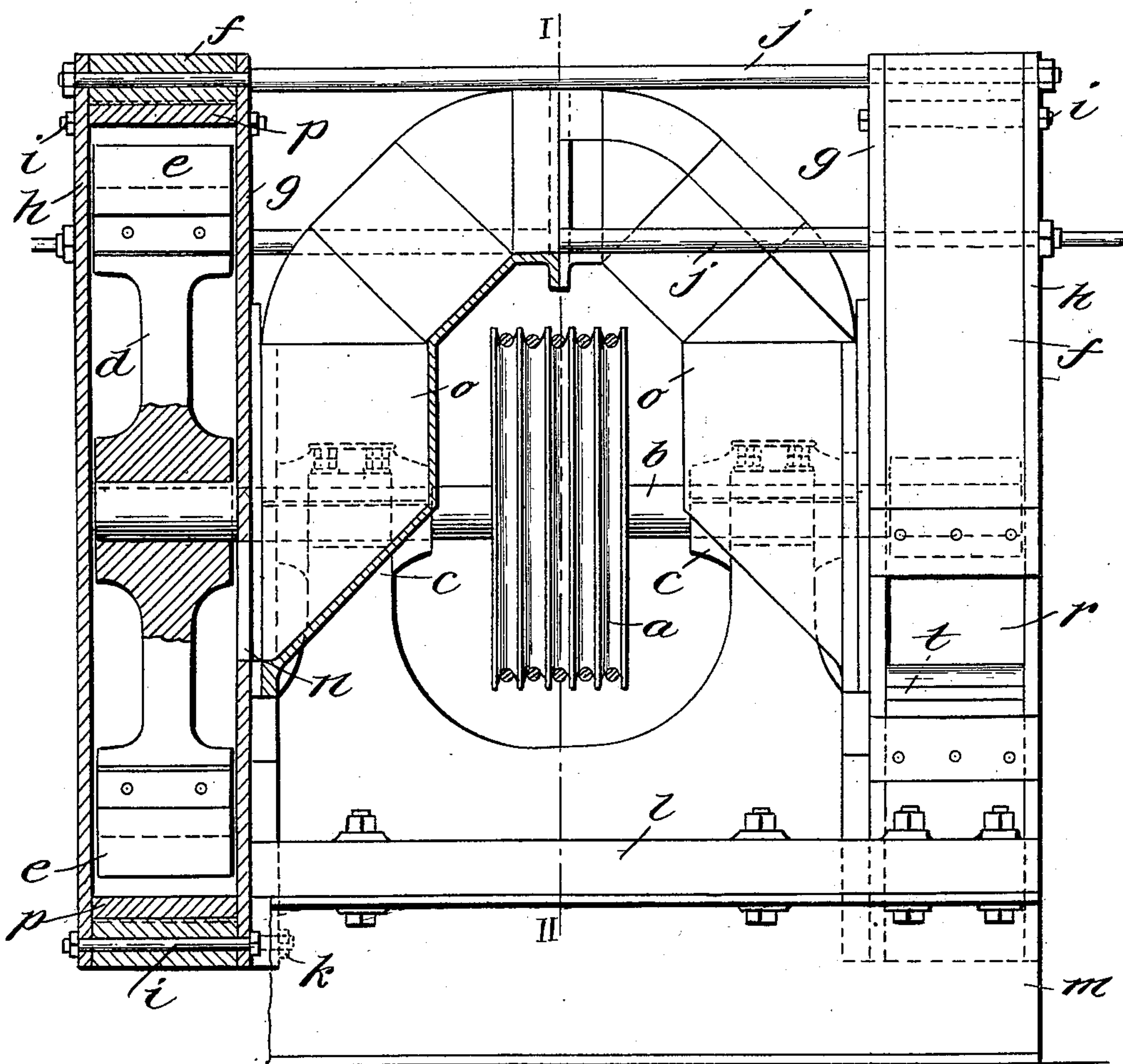
C. F. DELFOS.
CRUSHING OR PULVERIZING MACHINE.

(Application filed Nov. 23, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses:

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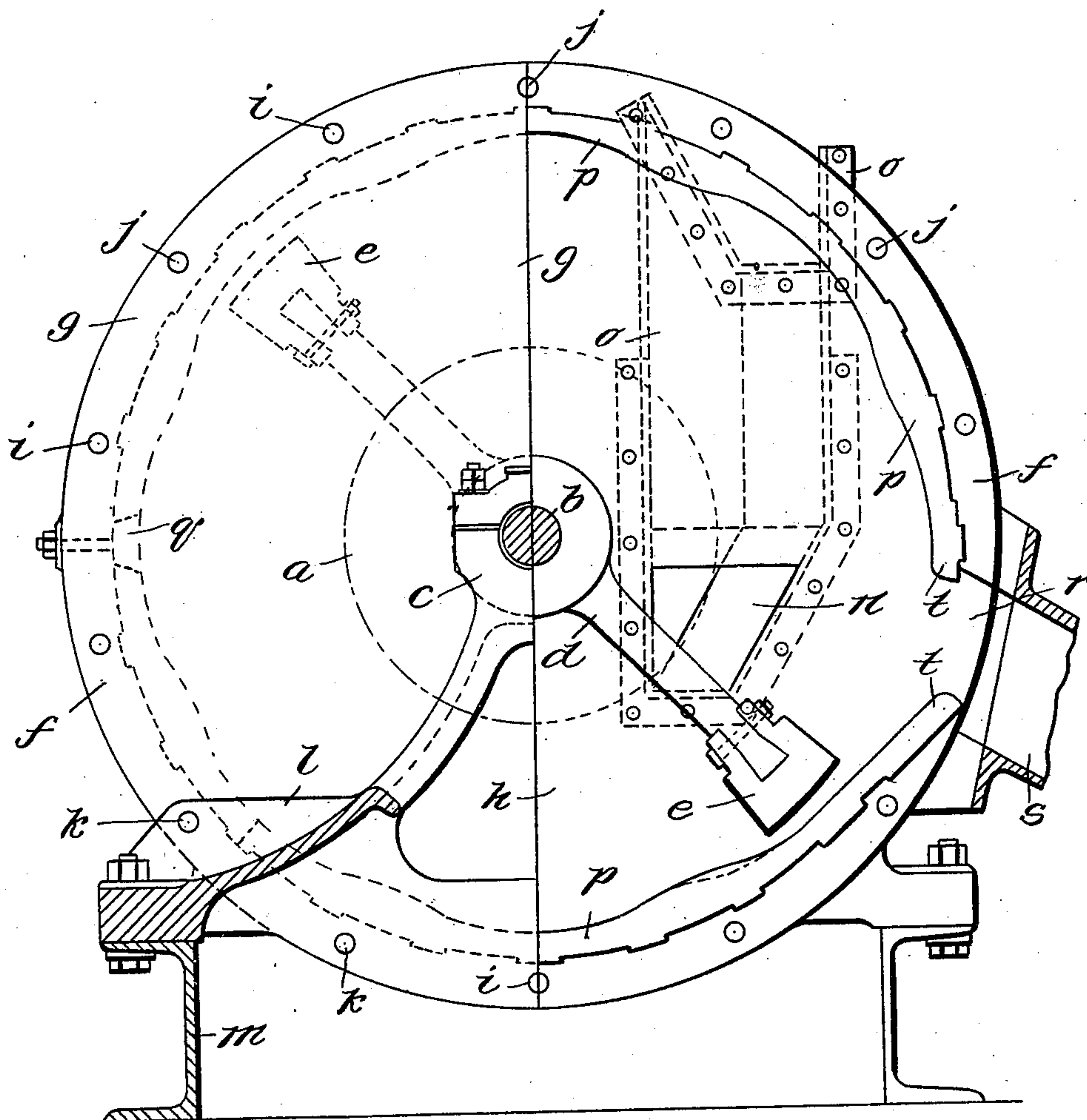
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(Application filed Nov. 23, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

CORNELIS FREDRIK DELFOS, OF PRETORIA, SOUTH AFRICAN REPUBLIC.

CRUSHING OR PULVERIZING MACHINE.

SPECIFICATION forming part of Letters Patent No. 680,650, dated August 13, 1901.

Application filed November 23, 1900. Serial No. 37,529. (No model.)

To all whom it may concern:

Be it known that I, CORNELIS FREDRIK DELFOS, a citizen of the South African Republic, residing at Pretoria, Transvaal, South Africa, but at present of Amsterdam, Holland, have invented a certain new and useful Improvement in Crushing or Pulverizing Machines, of which the following is a specification.

My invention relates to improvements in crushing or pulverizing machines, and principally to machines for further crushing or pulverizing ore or the like that has been already broken down, the object of same being to produce a machine of simple construction and one reliable and effective in operation.

The machine consists of a closed drum in which work two or more rotatable arms or beaters with removable heads mounted on a shaft, the interior peripheral surface of the drum being lined with removable steel segments of shapes making up an undulating surface. The material is fed into the drum from the side and is pulverized by the blow from the hammers and the impact against the segments, the shape of the latter driving back the material against the hammers, from which it is again thrown down, and so on until it is finally expelled in the form of powder through an opening in the peripheral surface. Two of such drums may be arranged to work from a common shaft and driving-pulley.

One form of machine constructed according to my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a machine having two drums, the left-hand side of the machine being partly in section. Fig. 2 is on the left a section on the line I II of Fig. 1, the driving-pulley being removed, and on the right an end elevation, the driving-pulley and end wall of the drum being removed.

On both ends of the shaft *b*, which runs in the bearings *c* and is driven by the rope-pulley *a*, are mounted the double beaters or arms *d*, which revolve inside the drums. To the ends of these beaters heavy hammer-heads *e* are secured in a suitable manner. The two sets of beaters are mounted at a mutual angle of ninety degrees in order to insure the proper counterpoising of the hammers and the easy running of the machine. The drums

consist of a strong ring *f*, an inner end wall *g*, and an outer end wall *h*. These parts are held together by screw-bolts, of which the bolts *i* merely pass through the ring *f* and the end walls *g* and *h* of each drum, whereas the stay-bolts *j* pass through both drums and connect them rigidly together, and the bolts *k* serve both to hold each drum together and attach the same to the base-plate *l*, which latter, as can be seen from Fig. 1, is cast in a single piece with the bearing-frame *c* and is in turn bolted to the supporting-girders *m*. The inner end wall *g* of each drum is provided with an opening *n* in direct communication with the charging-chute *o*, Fig. 2, which is carried above the rope-pulley *a*, Fig. 1, and distributes the ore or material into the two drums.

The peripheral ring *f* is covered on the inner side with steel segments *p*, which fit tightly together and can be taken apart on loosening the wedge *q*. These steel segments are of such a pattern that when placed in position they form a peripheral surface of wavy contour, as shown in Fig. 2. The ring is not continued quite all around the drum, but has an opening *r* on the right-hand side, Fig. 2, communicating direct with the discharging-chute *s*. The size of this opening is regulated by the length of the end segments or pieces *t*, which may have rounded ends to allow of a proper passage for the material. This opening depends upon the amount of work to be done by the machine and will vary according to the working speed and the kind of material to be crushed.

As soon as the ore or material enters the drum through the opening *n* it is struck by one of the hammer-heads *e* and, as a result of the force of the blow and the impact against the wavy peripheral ring, is broken and pulverized almost immediately. Thrown backward by the projecting portions of the shoes *p*, the ore is again immediately struck by one of the hammer-heads, and this operation is repeated until the thoroughly-pulverized ore is driven out centrifugally by the beaters or hammers through the opening *r* into the discharging-chute *s*.

The hammer-heads *e*, the steel shoes *p*, and the end pieces *t* are rapidly worn away, and for this reason provision is made for these

parts to be easily taken out and replaced by new ones.

In practice only the leading side of the undulation on each segment receives the impact 5 of the material, and hence such segment is worn, as shown by the dotted line *x* in Fig. 2. To make the segments, therefore, more lasting, I form the undulations, preferably, equal sided, so that the segments may be turned 10 end for end when the wear has rendered them less efficient. When the other side is worn down in the same manner, the segment is taken out and replaced by a new one.

What I claim is—

15 In a crushing and pulverizing machine, two drums each consisting of a ring having an opening and circular end plates fitted against the rings, tie-bolts passing through the end plates and rings of both drums to thereby rigidly 20 unite the same, a second series of bolts passing through the end plates and ring of each drum, a plurality of segments in the drum bearing against the inner surfaces of

the rings, having undulatory working surfaces, wedges fitted against the segments and 25 secured to the rings, a shaft extending centrally through said plates, radial arms in the drums, on the ends of the shaft, detachable hammer-heads secured to said arms, a driving member on said shaft between the drums, 30 a hopper between said drums and located over said driving member, said hopper having supply-spouts leading to openings in the inner plates of said drums, a bearing-frame for said shaft, a base-piece rigidly connected with the 35 bearing-frame and bolted to the inner of said circular end plates, and discharge-chutes leading from the openings in said rings, substantially as described.

In testimony whereof I have hereunto set 40 my hand in the presence of two subscribing witnesses.

CORNELIS FREDRIK DELFOS.

Witnesses:

THOMAS HERMANUS VERHAVE,
AUGUST SIEGFRIED DOCEN.