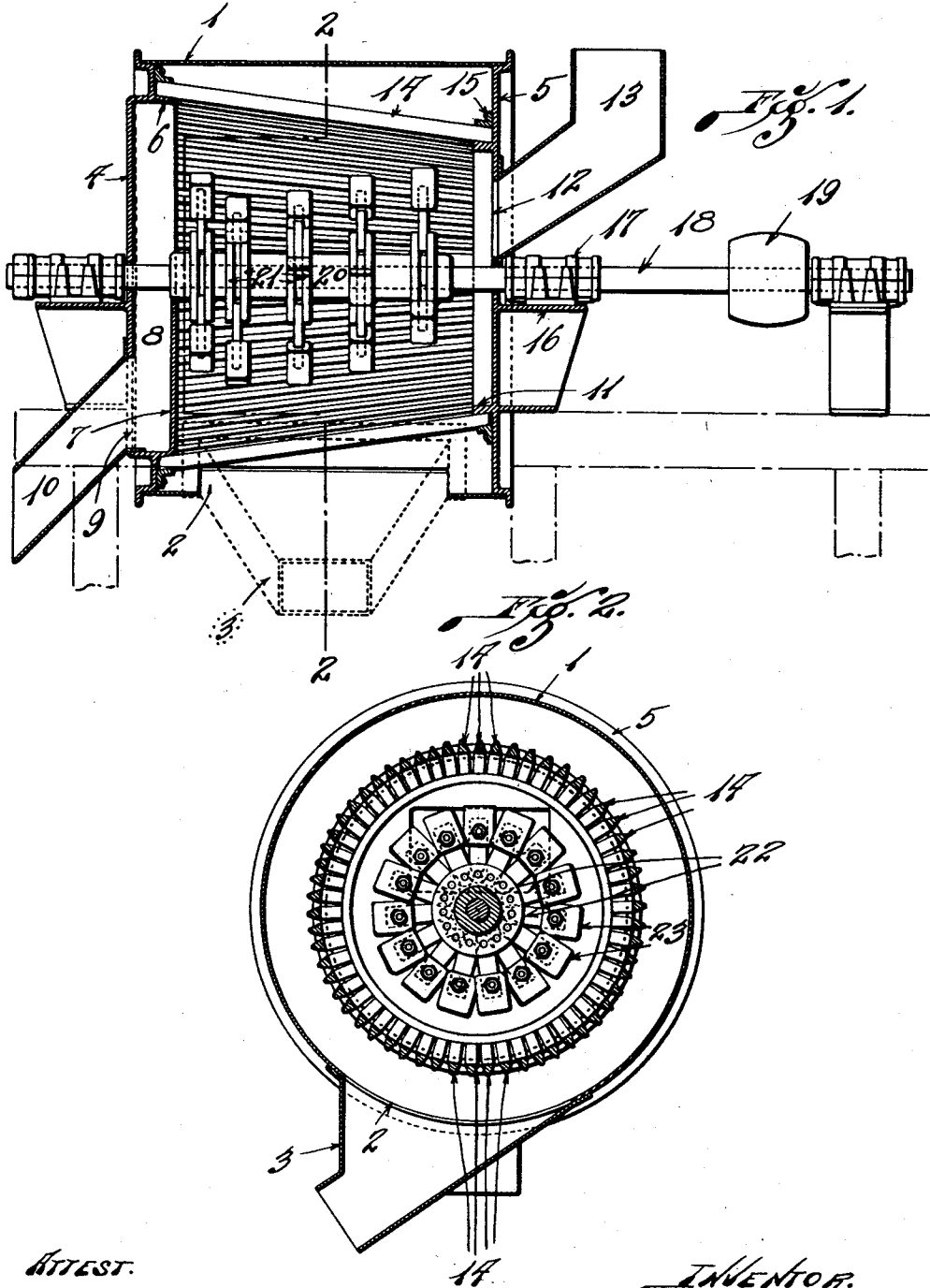


M. F. WILLIAMS.
 ORE CRUSHER.
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1,047,356.

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WITNESSES:
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ORE-CRUSHER.

1,047,356.

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To all whom it may concern:

Be it known that I, MILTON F. WILLIAMS, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Ore-Crushers, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section taken lengthwise through the center of an ore crusher of my improved construction. Fig. 2 is a vertical section taken on a line 2—2 of Fig. 1.

This invention relates to a new and useful improvement in crushing machinery of that type particularly designed for crushing or disintegrating ore, coal, shale, clay or like material.

The principal objects of my invention are to provide a simple, inexpensive crushing machine which can be operated with little power which has comparatively large capacity and the parts of which can be easily and cheaply repaired when worn or broken from use.

To the above purposes my invention consists in certain novel features of construction and arrangement of parts hereinafter more fully described and claimed.

Referring by numerals to the accompanying drawings, 1 designates the horizontally-disposed cylindrical shell forming the body of the machine which shell is preferably constructed of heavy sheet metal and provided in its lower portion with an opening 2 from which leads a discharge spout 3. Located in the ends of the shell or housing and fixed thereto in any suitable manner are heads 4 and 5 preferably of cast metal and formed on or fixed to the inner face of the head 4 adjacent the outer edge thereof is an inwardly projecting flange 6 which forms a support for the ends of the bars forming the grate or grinding cylinder. Formed integral with the inner edge of the lower portion of this flange 6 is a vertically-disposed wall 7 which extends entirely across the lower portion of the head 4, and thus a space or chamber 8 is formed between said wall 7 and the lower portion of head 4. Located in the lower portion of the head 4 is an

opening 9 which forms an outlet from the space 8 and leading from this opening 9 is a discharge spout 10.

Formed on or fixed to the inner face of the head 5 is an inwardly projecting annular flange 11 the diameter of which is less than the diameter of the flange 6 and this flange 11 forms a support for the corresponding ends of the bars forming the grinding cage of the machine. Formed through the upper portion of the head 5 is an opening 12 and leading thereto is a hopper 13 by means of which the material to be crushed or disintegrated is delivered into the machine.

The grinding cylinder which forms an essential feature of my improved machine is composed of a series of bars 14 preferably of steel appropriately spaced apart and the ends of these bars rest upon the flanges 6 and 11 heretofore described and said bars are held in proper position by clamping rings 15 which latter are fixed in any suitable manner to the heads 4 and 5.

As heretofore stated the flange 11 is smaller in diameter than the flange 6 and for this reason the bars 14 when properly positioned form a grinding cage which tapers toward the head 5, thus the material to be crushed or disintegrated which is fed into the machine through the hopper 13 will by gravity naturally pass to the opposite and larger end of the grinding cylinder but said material will be held within the cylinder to be engaged by the grinding hammers by the wall 7.

Brackets 16 are formed on or fixed to the outer faces of the heads 4 and 5 and serve as bearings for the frame-work or concrete piers which support the machine. Located on top of the brackets 16 are suitable bearings 17 in which is journaled a longitudinally disposed shaft 18 which extends through the center of the machine and carries the flexible hammers which operate within the grinding cage. This shaft can be driven in any suitable manner preferably by means of a belt operating on a pulley 19 carried by said shaft. Fixed on the shaft 18 within the cage is a sleeve 20 and formed thereon at suitable distances apart are flanges 21 arranged in pairs. Pivotaly mounted in any suitable manner between the pairs of flanges are the inner ends of short bars 22, the outer end of which carry hammer heads 23 of suitable size and shape.

During the operation, of my improved

machine the material to be crushed or dis-
 integrated is delivered into the hopper 13
 and passes therefrom through the opening
 12 into the grinding chamber. The shaft 18
 5 is driven at a suitable speed and the flexible
 hammers comprising the heads 23 and the
 bars 22 assume radial positions with respect
 to the shaft 18 due to centrifugal force.
 The material fed into the machine will be
 10 struck by the rapidly moving hammers and
 thrown with considerable force against the
 grinding cage and thus said material will be
 very quickly crushed and disintegrated. The
 15 finer particles of material will discharge be-
 tween the bars forming the grinding cage
 and will pass out of the grinding chamber
 through the discharge spout 3 while the
 larger pieces of material will be carried
 20 around within the grinding cage and repeat-
 edly struck by the flexible hammers until
 completely disintegrated. Oversized pieces
 of particularly hard material which are not
 readily disintegrated will be carried around
 by the flexible hammers and thrown to the
 25 upper part of the grinding cage and eventu-
 ally these large or oversized pieces of ma-
 terial will fall into the space 8 between the
 head 4 and wall 7 and will discharge from
 said space through the spout 10.
 30 A grinding or crushing machine of my
 improved construction is comparatively sim-

ple, can be easily and cheaply operated, can
 be readily repaired and is particularly adapt-
 ed for crushing, grinding and disintegrating
 semi-hard material such as clay, coal, shale 3.
 and comparatively soft ore bearing stone.

It will be readily understood that minor
 changes in the size, form and construction of
 the various parts of my improved crusher
 can be made and substituted for those here- 41
 in shown and described without departing
 from the spirit of my invention.

I claim:

A crusher comprising in combination a
 tapering perforate grinding cage having an 41
 inlet end and an outlet end, the outlet end
 of said cage being of greater diameter than
 the inlet end, a casing surrounding said
 cage and provided with an inlet, an outlet,
 50 and a second outlet intermediate said inlet
 and said outlet, a revoluble shaft extending
 through said cage, flexible beaters mounted
 thereon, and a wall interposed between the
 lower portion of the cage and the outlet of
 51 the casing for the purpose described.

In testimony whereof I hereunto affix my
 signature in the presence of two witnesses,
 this 24th day of August, 1911.

MILTON F. WILLIAMS.

Witnesses:

M. P. SMITH,
 JESSIE CLARK.