

Patented May 14, 1912.

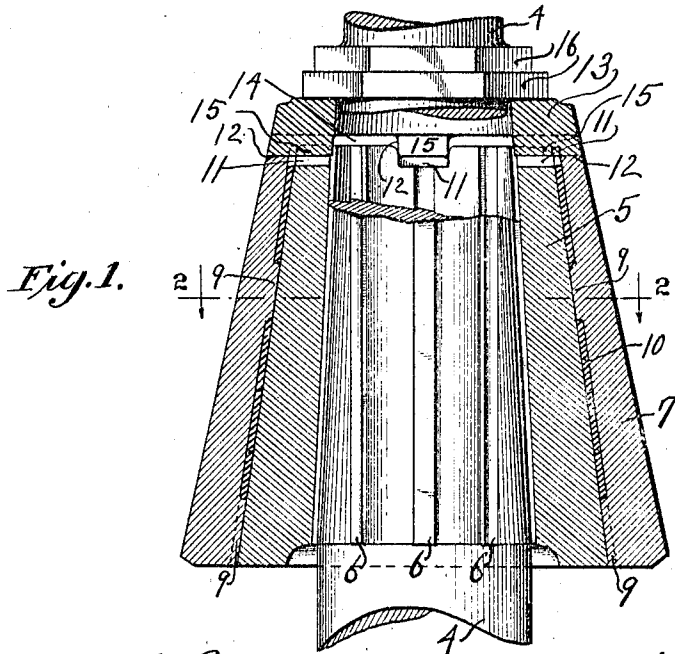
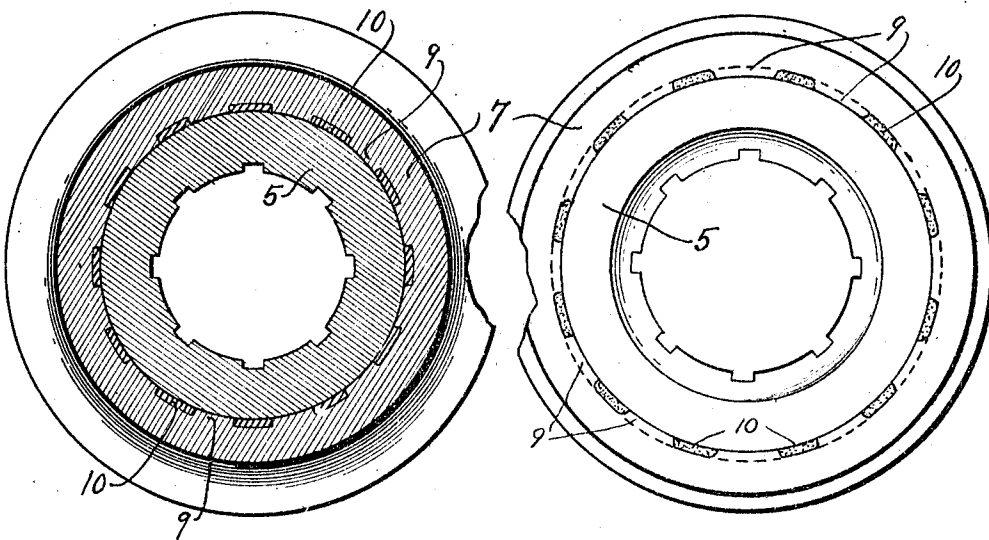


Fig. 1.

Fig. 2.

Fig. 3.



Attest:
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UNITED STATES PATENT OFFICE.

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CRUSHER-HEAD FOR GRINDING-MILLS.

1,026,319.

Specification of Letters Patent.

Patented May 14, 1912.

Application filed March 12, 1912. Serial No. 683,208.

To all whom it may concern:

Be it known that I, HARRY A. HUNT, a citizen of the United States, and a resident of Wilmington, in the county of Newcastle and State of Delaware, have made and invented certain new and useful Improvements in Crusher-Heads for Grinding-Mills, of which the following is a specification.

My invention relates to crusher heads for gyratory mills used for crushing rock, ore, and similar hard substances; and particularly to that type of crusher head in which a supporting center or core located upon the main shaft of the mill is employed and which core is surrounded by a mantle formed commonly from cast manganese steel, whereby the mantle when worn out in use may be readily removed and a new mantle substituted therefor.

The supporting core or center of crusher heads of the type above referred to is commonly conical in form, and the mantle is in the form of a comparatively thin shell also of conical form. Such a mantle when made of cast manganese steel in order to secure excessive strength and wearing qualities is found to stretch considerably in use as cast manganese steel while extremely hard and tough is quite ductile and the action of the hard material thereupon will cause the metal to flow, from which it follows that in use the mantle will become loose upon the core unless provision is made for compensating for the expansion of the mantle.

The object of my invention is to provide means for adjusting the mantle longitudinally upon the conical supporting core above referred to in order to keep the mantle tight thereupon; and the same consists in means for forcing the surrounding mantle downward upon the core; said adjusting means including also means for locking the mantle and core together so that the mantle will be driven from the core.

A further object of my invention is to provide a crusher head, the inner surface of the removable mantle of which is conical throughout the entire length of the mantle, so that a mantle is procured which is simple in form and which may be readily cast, and

the inner surface thereof finished by grinding at a minimum of trouble and expense.

With the above and other objects of invention in view, my invention consists in the improved crusher head hereinafter described and claimed, and in such variations and modifications thereof as will be obvious to those skilled in the art to which my invention relates.

Referring to the drawing wherein the preferred embodiment of my invention is illustrated: Figure 1 is a view showing a section of my improved crusher head taken upon a vertical central plane; Fig. 2 is a view showing a section upon a transverse plane indicated by the line 2-2; Fig. 1, looking down; and Fig. 3 is a view showing my improved crusher head as seen from a position beneath it looking up.

In the drawing, the main driving shaft of a gyratory crushing mill is shown at 4, and 5 is a supporting core or center conical in form and shown as formed separate from the driving shaft 4 and secured in place thereupon by means of suitable keys 6, although the core and shaft may be formed as a single integral member if desired. The core 5 is commonly formed from carbon steel, cast iron or similar easily machinable metal, and the periphery thereof finished by grinding or turning. Surrounding the supporting core 5 is a mantle 7 conical in form and which mantle is adjustable longitudinally of the core, from which it follows that any looseness between the core and mantle may be compensated for or taken up by moving the mantle downward upon the core. The inner surface of the mantle is uniformly conical throughout its entire length so that the same may be ground more easily than were such surface broken or interrupted by projections, and the said surface may be continuous or provided with a plurality of spaced lugs or grinding pads such as are shown at 9 to reduce the area of surface to be finished by grinding, in which case the spaces between the pads are filled with zinc, Babbitt metal or similar easily fusible metal as shown at 10; the inner ends of the lugs or pads being in contact with the periphery

of the core and the fusible metal being poured into the space between the sides of the grinding pads or lugs and the surface of the core, as will be understood. The mantle 7 is positively driven from the supporting core or center 5, although it will be understood that friction between the core and mantle contributes to the driving action, to which end the upper end of the core is provided with one or more recesses 11 and the mantle with a corresponding number of recesses 12, the recesses upon the core and mantle registering with one another when the mantle is in place. An annular collar 13 is provided which bears upon the upper end of the mantle, but not upon the upper end of the core when the mantle is first put in place, there being a space between the under side of the collar and the upper end of the core, as shown at 14. The collar is provided with projecting lugs 15 corresponding in number with the recesses formed in the core and mantle and which lugs lie within the recesses 11 and 12 of the core and mantle when the parts are assembled, from which it follows that the lugs upon the collar act as driving elements through which the mantle is driven from the core. The annular collar 13 may be forced downward by nuts 16 in threaded engagement with the main driving shaft 4, as will be understood.

In view of the premises it will be obvious that when the mantle 7 becomes enlarged or stretched in use, and thus loose upon the central core 5, the collar 13 may be forced downward from time to time, whereby the mantle 7 will be forced downward upon the core 5 and looseness between the two taken up and a tight fit maintained between the core and mantle; the mantle being always positively driven from the core through the lugs or projections 15 upon the annular collar.

Having thus described and explained my invention, I claim and desire to secure by Letters Patent:—

1. In a crusher head, a supporting core conical in form and having a recess at its smaller end; a conical mantle surrounding said core and adjustable longitudinally thereupon, said mantle having a recess at its smaller end adapted to register with the recess aforesaid in said core; an annular collar adjacent the smaller ends of said core and mantle; and a lug upon said collar and which lug lies within the recesses aforesaid when the parts are assembled.

2. In a crusher head, a supporting core conical in form and having a recess at its smaller end; a conical mantle surrounding said core and adjustable longitudinally thereupon, said mantle having a recess at its smaller end adapted to register with the

recess aforesaid in said core; an annular collar overlying the smaller ends of said core and mantle; and a lug upon said collar and which lug lies within the recesses aforesaid when the parts are assembled.

3. In a crusher head, a supporting core conical in form and having a recess at its smaller end; a conical mantle surrounding said core and adjustable longitudinally thereupon and the smaller end of which projects above the corresponding end of said core, said mantle having a recess at its smaller end adapted to register with the recess aforesaid in said core; an annular collar overlying the smaller ends of said core and mantle; and a lug upon said collar and which lug lies within the recesses aforesaid when the parts are assembled.

4. In a crusher head, a supporting core conical in form and having a recess at its smaller end; a mantle surrounding said core and adjustable longitudinally thereupon and the inner surface of which is conical in form throughout its entire length, said mantle having a recess at its smaller end adapted to register with the recess aforesaid in said core; an annular collar adjacent the smaller ends of said core and mantle; and a lug upon said collar and which lug lies within the recesses aforesaid when the parts are assembled.

5. In a crusher head, a supporting core conical in form and having a recess at its smaller end; a mantle surrounding said core and adjustable longitudinally thereupon, the inner surface of which mantle is conical in form throughout its entire length and the smaller end of which projects above the corresponding end of said core, said mantle having a recess at its smaller end adapted to register with the recess aforesaid in said core; an annular collar overlying the smaller ends of said core and mantle; and a lug upon said collar and which lug lies within the recesses aforesaid when the parts are assembled.

6. In a crusher head, a supporting core conical in form and having a recess at its smaller end; a conical mantle surrounding said core and adjustable longitudinally thereupon, said mantle having a recess at its smaller end adapted to register with the recess aforesaid in said core; means adjacent the smaller ends of said core and mantle for forcing said mantle longitudinally of said core; and a projecting element carried by said forcing means and adapted to lie within the recesses aforesaid when the parts are assembled.

7. In a crusher head, a supporting core conical in form and having a recess; a conical mantle surrounding said core and adjustable longitudinally thereupon, said mantle having a recess adapted to register with

the recess aforesaid in said core; means engaging the smaller end of said mantle for forcing the same longitudinally of said core; and a member adapted to lie within the recesses aforesaid when the parts are assembled and through which said mantle is driven from said core.

Signed at Wilmington, in the county of Newcastle, and State of Delaware this sixth day of March, A. D. 1912.

HARRY A. HUNT.

Witnesses:

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FRED O. RUSH.