July 13, 1926. 1,592,312

E. B. SYMONS

CRUSHING HEAD

Filed Sept. 14, 1923

Fig. 1

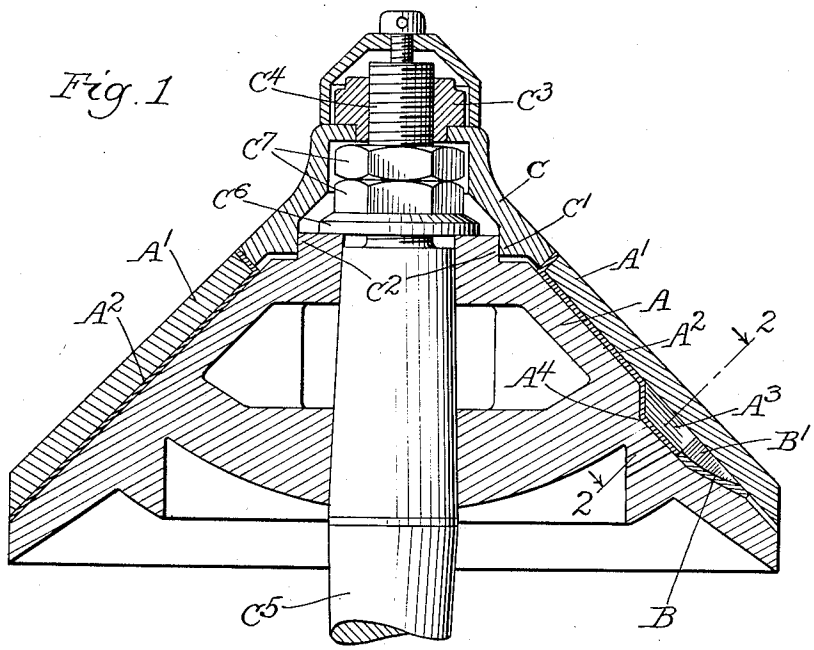


Fig. 2.

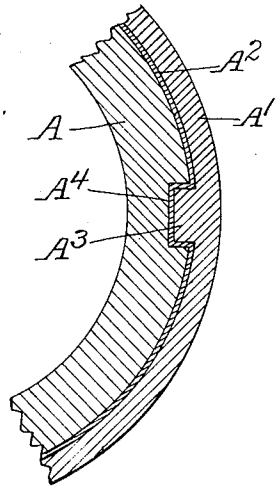
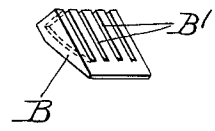


Fig. 3.



Inventor.
Edgar B. Symons.
by Parker & Carter
Attorneys.

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UNITED STATES PATENT OFFICE.

EDGAR B. SYMONS, OF BAKERSFIELD, CALIFORNIA, ASSIGNOR TO SYMONS BROTHERS COMPANY, OF BAKERSFIELD, CALIFORNIA, A CORPORATION OF SOUTH DAKOTA.

CRUSHING HEAD.

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My invention relates to improvements in crushing heads for gyratory crushers and the like and has for one object to provide a new and improved means for holding and positioning the resistant mantle or cover on a crusher head or cone. Another object is to provide a means for preventing relative rotation of the head and mantle without interfering with the adjustment of the mantle on the head and without interfering with the downward creep of the mantle along the conical head as it is tightened from time to time. Other objects will appear from time to time in the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a section through a crushing cone and mantle;

Figure 2 is a section along the line 2—2 of Figure 1.

Like parts are indicated by like characters throughout.

A is a conical crushing head. It carries a conical mantle A^1 of manganese steel or other suitable material, backed by a backing or cushion A^2 of zinc or other suitable material. A^3 is a lug cast integral with the mantle on the inner side thereof adapted to penetrate a slot A^4 in the body of the conical head so as to prevent rotation of the mantle with respect to the cone. It will be noted that the zinc backing is placed between the lug and slot in which it travels through a major part of the slot.

B is a wood filler block located within the slot A^4. This filler block has longitudinal saw cuts B^1 therein which permit compression of the filler block. It will be noted that this wood filler block rests directly against the surface of the crushing cone and that there is no zinc backing between it and the cone. This block abuts immediately upon the lower end of the lug A^3 and prevents the zinc from filling that part of the slot A^4 not filled by the lug A^3.

C is a locking collar engaging the upper edge of the mantle A^1 having a shoulder C^1 to engage a cylindrical part C^2 on the crushing cone by which it is centered. C^3 is a nut screw threaded on the shaft C^4 projecting from the cone and adapted to force the collar C downwardly, the collar being centered by the member C^2, can move only in the direction parallel to the axis of the cone and tends to exert an equal pressure all the way around against the upper edge of the mantle seating it firmly on the cone.

The shaft C^4 is a screw threaded extension from the crusher shaft C^5 which is held in the cone by means of the compression ring C^6 and the nuts C^7 all of which are contained within and protected by the collar C though both these nuts and the compression ring are out of contact with the collar.

The mantle, especially if made of manganese steel tends to peen or stretch and to become loose on the cone. It then is necessary to force it further down against the zinc backing and seat it again. As this takes place the lug A^3 must slide down through the slot and if the slot were filled with zinc this could not be done except at the expense of causing an area of increased pressure where the zinc in the slot was compressed. This might cause bulging of the mantle or might force the mantle unevenly on the cone. The wood block does not interfere because the movement is comparativelv slight and can be taken up by the compression of the wood block as the holding lug slides down on its seat.

It will be understood that when the mantle is made of manganese steel, which cannot satisfactorily be machined, it is sufficient to make a satisfactorily good casting to place the mantle on the cone spacing it slightly on the cone and then pour the molten zinc backing in. This molten zinc fills the space between the cone and the mantle and provides as smooth support and backing for the cone, and as the cone is forced down along the mantle as it stretches the zinc engaging the rough surface of the mantle will travel with it sliding downwardly along the smooth surface of the cone.

I claim:

1. A crushing head comprising a truncated cone, a mantle thereon, a cylindrical extension at the upper end of the cone and a clamping ring centered on such cylindrical extension and means for forcing the ring downwardly toward the cone to seat the mantle thereon.

2. A crushing head comprising a head portion, a shaft passing therethrough, a collar on the shaft engaging the head, nuts screw threaded on the shaft adapted to force

the collar on the head and lock the parts together and a clamping ring resting on the head and enclosing the collar and nuts, and means for holding it in position.

3. A crushing head comprising a head portion, a shaft passing therethrough, a collar on the shaft engaging the head, nuts screw threaded on the shaft adapted to force the collar on the head and lock the parts together and a clamping ring resting on the head and enclosing the collar and nuts, and means for holding it in position, a mantle for the cone, the clamping ring being adapted to hold the mantle in place thereon.

4. A crushing head comprising a smooth surfaced cone, a mantle therefor having an irregular surface, a soft cast metal backing interlocking with the irregular surface of the mantle and slidable on the cone, the cone being slotted, a lug projecting inwardly from the mantle into the slot, the backing being interposed between the lug and the walls of the slot and means located in the slot for preventing entrance of the cast metal into that part thereof not occupied by the lug.

5. A crushing head comprising a smooth surfaced cone, a mantle therefor having an irregular surface, a soft cast metal backing interlocking with the irregular surface of the mantle and slidable on the cone, the cone being slotted, a lug projecting inwardly from the mantle into the slot, the backing being interposed between the lug and the walls of the slot and means located in the slot for preventing entrance of the cast metal into that part thereof not occupied by the lug, said means comprising a compressible filler block located in the slot.

6. A crushing head comprising a smooth surfaced cone, a mantle therefor having an irregular surface, a soft cast metal backing interlocking with the irregular surface of the mantle and slidable on the cone, the cone being slotted, a lug projecting inwardly from the mantle into the slot, the backing being interposed between the lug and the walls of the slot and means located in the slot for preventing entrance of the cast metal into that part thereof not occupied by the lug, said means comprising a filler block located in the slot and having slots cut therein to permit compression thereof.

7. A crushing head comprising a cone having a smooth bearing surface, a mantle therefor having an irregular surface, and a soft cast metal backing interlocking with the irregular surface and slidable on the smooth surface, and means for forcing the mantle down along the cone to slide the backing therealong and seat the mantle and backing thereon, and means for preventing relative rotary movement of cone and mantle, comprising a lug projecting inwardly from the mantle and slidable in a slot in the cone, the cast metal backing being interposed between the lug and the walls of the slot.

8. A crushing head comprising a cone having a smooth bearing surface, a mantle therefor having an irregular surface, and a soft cast metal backing interlocking with the irregular surface and slidable on the smooth surface, and means for forcing the mantle down along the cone to slide the backing therealong and seat the mantle and backing thereon, and means for preventing relative rotary movement of cone and mantle, comprising a lug projecting inwardly from the mantle and slidable in a slot in the cone, the cast metal backing being interposed between the lug and the walls of the slot, the lug being shorter than the slot and means for preventing the entrance of the cast metal into that part of the slot not filled by the lug.

9. A crushing head comprising a cone having a smooth bearing surface, a mantle therefor having an irregular surface, and a soft cast metal backing interlocking with the irregular surface and slidable on the smooth surface, and means for forcing the mantle down along the cone to slide the backing therealong and seat the mantle and backing thereon, means for preventing relative rotary movement of cone and mantle, comprising a lug projecting inwardly from the mantle and slidable in a slot in the cone, the cast metal backing being interposed between the lug and the walls of the slot, the lug being shorter than the slot and means for preventing the entrance of the cast metal into that part of the slot not filled by the lug, comprising a compressible filler block.

10. A crushing head comprising a cone, a mantle mounted thereon, a guiding means positioned at the upper portion of said cone, a clamping ring adapted to be moved along said guiding means, and means for moving the ring downwardly toward the cone to seat the mantle thereon, the clamping ring being shaped to conform to the upper edge of the mantle and to continue the conic surface thereof.

11. A crushing head for gyratory crushers, comprising a crushing shaft, a truncated cone positioned thereupon, means for securing the cone upon said shaft, a mantle positioned upon said head, a clamping ring adapted to engage and exert pressure against the upper edge of said mantle, means for moving said clamping ring downwardly along said head against said mantle, said clamping ring being shaped to surround the head securing means.

12. A crushing head comprising a truncated cone, a shaft passing therethrough, a mantle positioned about said cone, securing means positioned on said shaft and adapted to force said cone downwardly upon said

shaft, a clamping ring for said mantle, said clamping ring surrounding and enclosing said cone securing means, and additional means for forcing said clamping ring downwardly against said concave.

13. A crushing head comprising a truncated cone, a shaft passing therethrough, a mantle positioned about said cone, securing means positioned on said shaft and adapted to force said cone downwardly upon said shaft, a clamping ring for said mantle, said clamping ring surrounding and enclosing said cone securing means, and additional means for forcing said clamping ring downwardly against said concave, and an enclosing member for said second securing means, superposed upon said clamping ring.

Signed at Chicago, county of Cook, and State of Illinois, this 12th day of September, 1923.

EDGAR B. SYMONS.