H. A. HUNT.

CRUSHING HEAD FOR ORE AND ROCK CRUSHERS.

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1,009,520.

Patented Nov. 21, 1911.

FIG. 1.

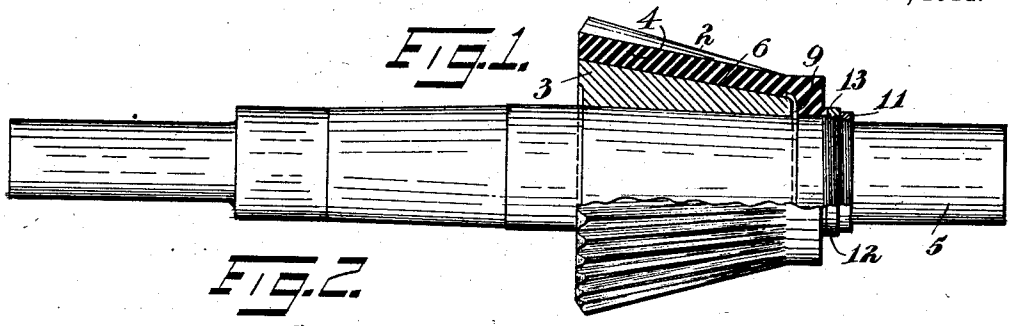


FIG. 2.

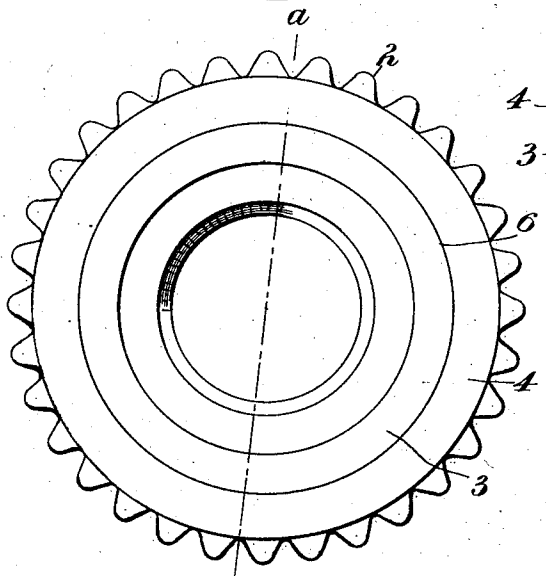


FIG. 3.

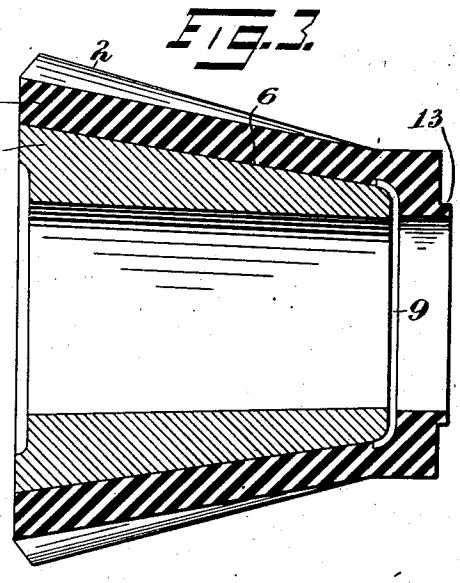


FIG. 4.

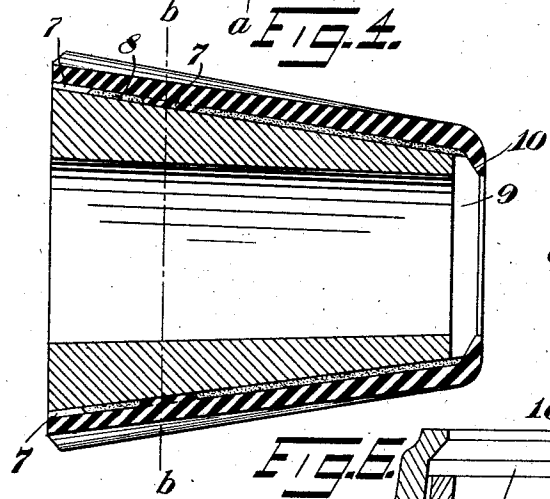


FIG. 5.

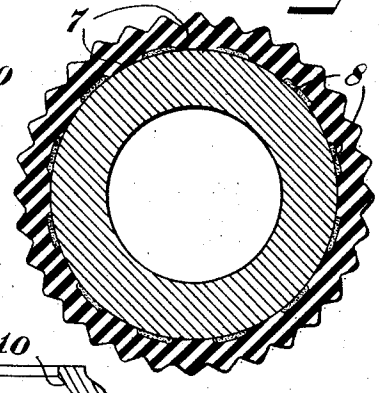
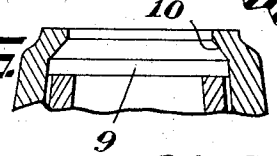


FIG. 6.



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UNITED STATES PATENT OFFICE.

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CRUSHING-HEAD FOR ORE AND ROCK CRUSHERS.

1,009,520. Specification of Letters Patent. Patented Nov. 21, 1911.

Application filed November 6, 1909. Serial No. 526,493.

To all whom it may concern:

Be it known that I, HARRY A. HUNT, a citizen of the United States, residing in Glen Gardner, in the county of Hunterdon and State of New Jersey, have invented certain new and useful Improvements in Crushing-Heads for Ore and Rock Crushers, of which the following is a specification.

This improvement relates to rock and ore crushers, more particularly, however, to an improved mantle therefor, the object of the invention being to provide such a mantle as can be easily removed when worn out, which can be readily bored or machined from top to bottom to fit the center or readily ground when made of unmachineable metal, which is so formed that it will firmly fit the center and so constructed that should the metal of which the mantle is made stretch or expand it will nevertheless firmly fit the center carrying it and be held thereon under compression and by a downward pressure on such mantle, and which will also have a bearing engagement on its inner or center member at the lower portion thereof, where the greatest crushing action takes place.

In the drawings accompanying and forming part of this specification, Figure 1 illustrates one form of this improved mantle partly broken away and its core or center secured in position on a vertical shaft; Fig. 2 is an underside view of the mantle and its core; Fig. 3 is a vertical sectional view of the mantle and its core or center detached from the shaft, taken in line *a*—*a*, Fig. 2; Fig. 4 is a vertical sectional view of the core and its mantle illustrating, however, a somewhat different means for securing the mantle to its center; Fig. 5 is a cross-sectional view taken in line *b*—*b*, Fig. 4; and Fig. 6 is a detail, partly sectional, view of the upper portion of the mantle and the core, illustrating a somewhat different form of mantle.

Similar characters of reference designate corresponding parts throughout the drawings.

The crushing head 2 comprises a core or center 3 and a mantle 4. The center is bored to fit the shaft 5 and is provided with a tapered exterior face 6 extending from end to end thereof. The mantle, which may be formed with a plain crushing face or a corrugated one as preferred in practice, is taper-bored to closely engage the outside of the center or core, whereby it will be held in position to a material extent by means of the frictional tapered surfaces of the mantle bore and the exterior face of the core in the form shown in Figs. 1, 2, 3 and 6. In the form shown in Figs. 4 and 5, however, the mantle may be so made that instead of having it fit the center throughout the entire bore thereof, the mantle may be provided with bearing surfaces or lugs 7 located at intervals around the same, the spaces thus formed between the mantle and its center being filled with spelter or zinc, as at 8. These bearing surfaces or lugs, however, are so located that one series is at the lower end of the crushing head, and another above it, and may be staggered one set relatively to the other so that the mantle will have a bearing engagement at its lower end or base on the center or core, at which point the greatest crushing action takes place. By forming the mantle with bearing surfaces in the manner set forth the necessity of machining or grinding the entire inner tapered surface of the mantle is avoided, this being an expensive operation, especially when the mantle is made of unmachineable metal, such for instance as manganese steel. It will be observed, however, that even when formed in the manner shown in Figs. 4 and 5, should the mantle stretch or expand it will still have a firm bearing engagement at its lower end upon its core or center, at which point, as hereinbefore stated, the greatest crushing action of the head takes place. To permit the proper bearing engagement of the mantle with its core should the mantle expand or stretch the mantle is so formed at its upper end that it is spaced apart from the upper end of the core or center, as at 9, this being obtained by forming the mantle in such a manner that it is turned inwardly over the upper end of the core, which inturned portion 10, however, is located away from the upper end of the core or center.

In practice the mantle, which may be made of unmachineable metal while the center or core may be made of carbon steel or cast iron and fitted together in the manner set forth, is secured on the shaft by jam and

check nuts 11 and 12 respectively, which tend to hold the mantle under compression and firmly on its center or core. In other words, by this method of holding the mantle on to its core it will be observed that the whole mantle is put under a compression strain, that is to say, it is held on its core by downward pressure, which mode of securing the same is very much superior to that method in which the mantle is under tension, as is the case where the mantle is secured by means of a lug located at the bottom or base thereof, and as the mantle is not bolted or keyed to its center in any way it follows that it can be readily removed and replaced when worn out or broken. Furthermore, should the bore of the mantle become worn such wear can be readily taken up by the nuts hereinbefore referred to, which engage a raised portion or ring 13 forming a seat for such nuts on the upper portion of the mantle.

From the foregoing it will be observed that the mantle is secured in place by the tapered surface of its bore engaging the tapered surface of the center, whether the bearing surface of the mantle extends throughout the area of such mantle or is formed by relatively small bearing surfaces, and by means of a simple pair of nuts, without keys or other holding means, thus enabling the bore of the mantle to be readily machined and to have a firm bearing engagement throughout on its core in the form shown in Figs. 1, 2, 3 and 6, or as shown in Figs. 4 and 5 a firm bearing engagement on its core at the lower or base thereof, where it is subjected to the greatest crushing action, which firm engagement of one member with the other will remain constant notwithstanding any expansion or stretching of the metal of which the mantle may be formed.

It will be observed that by providing the mantle with an integral inturned ring-shaped portion or flange located above the upper end of the core, this flange is thus located between the compression means or nuts and the upper end of this core, so that the possibility of the mantle stretching to such an extent that the upper end thereof is carried below the upper end of the core and thus away from the nuts or compression means so as to render this compression means ineffective, is obviated, since in this improvement these nuts will always be in engagement with the flange of the mantle and thus press the mantle firmly upon the core, the flange being initially spaced apart from the upper end of the core, so that when such stretching of the mantle takes place the mantle can still be firmly pressed upon its core.

I claim as my invention:

1. In a rock or ore crusher, a crushing head comprising a supporting surface and a mantle fitting thereon, said mantle having an integral, inturned, ring-shaped portion having an opening therethrough, and adjustable means for engaging said ring-shaped portion for compressing the mantle on its supporting surface, said ring-shaped portion being located between such compression means and the upper end of its supporting surface whereby a portion of the mantle will always be between its supporting surface and its compression means.

2. In a rock or ore crusher, a crushing head comprising a tapered supporting surface and a mantle having a tapered bore fitting thereon, said mantle having an integral, inturned, ring-shaped portion having an opening therethrough and spaced from the upper end of said supporting surface, and adjustable means for engaging said ring-shaped portion for compressing the mantle on its supporting surface, said ring-shaped portion being located between such compression means and the upper end of its supporting surface whereby a portion of the mantle will always be between its supporting surface and its compression means.

3. In a rock or ore crusher, a crushing head comprising a tapered core, a shaft extending therethrough and having a threaded portion, a mantle having a tapered bore fitting said tapered core, said mantle having an integral, inturned, ring-shaped portion having an opening therethrough and spaced from the upper end of said core, and clamping nuts carried by the threaded portion of the shaft for engaging said ring-shaped portion to compress the mantle on to its core, said ring-shaped portion being located between such nuts and the upper end of the core so that such ring-shaped portion will always be between the clamping nuts and the core whereby on the settling of the mantle and the adjustment of the nuts the inturned portion will be brought into engagement with the upper end of the core and effectively clamped in such position.

4. In a rock or ore crusher, a crushing head comprising a tapered supporting surface and a mantle having a tapered bore fitting thereon, said mantle having an integral, inturned, ring-shaped portion having an opening therethrough and spaced from the upper end of said supporting surface, and adjustable means for engaging said ring-shaped portion for compressing the mantle on its supporting surface, said ring-shaped portion being located between such compression means and the upper end of its supporting surface whereby a portion of the mantle will always be between its supporting surface and its compression means, said supporting surface and mantle having one a plurality of integral bearing pads

spaced apart around the same where the greatest crushing action of the mantle takes place.

5. A taper bored mantle for a rock or ore crusher, having an integral, inturned, ring-shaped flange at its upper end adapted to extend over and be spaced apart from the upper end of a core and to be permanently engaged by clamping nuts carried by a shaft passing through such ring-shaped flange.

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