Nov. 26, 1940. O. C. GRUENDER 2,222,768

PLATE FOR JAW CRUSHERS

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Fig. 1

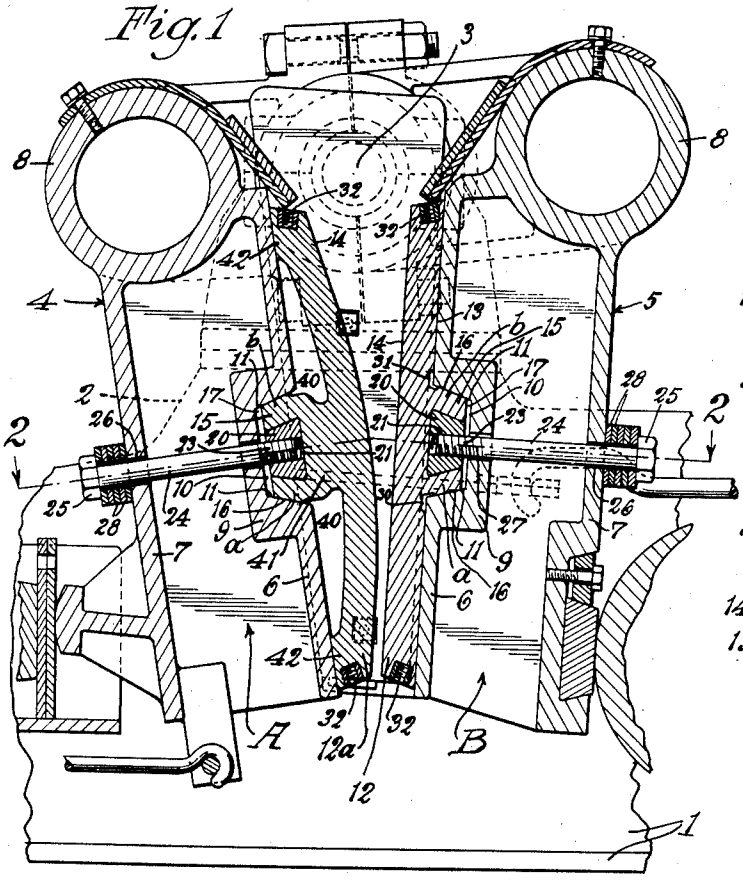


Fig. 3

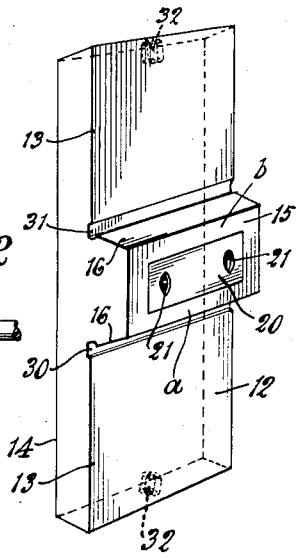
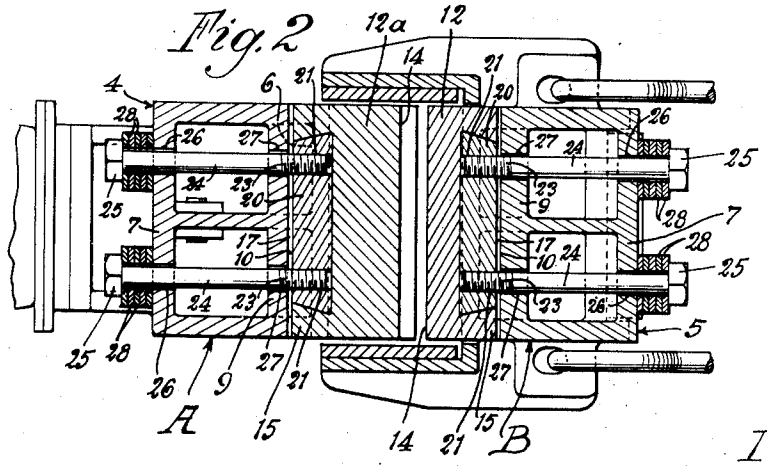


Fig. 2



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PLATE FOR JAW CRUSHERS

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4 Claims. (Cl. 83—53)

My invention relates to an improvement in removable crushing plates for jaw crushers and has for one purpose the provision of an improved plate which shall be easy to apply and to remove.

Another purpose is the provision of a plate which shall have a maximum of resistance and a minimum tendency to wear.

Another purpose is the provision of a plate which shall be readily reversible.

Other purposes will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawing wherein:

Fig. 1 is a vertical longitudinal section through a jaw crusher having a pair of my plates in position;

Fig. 2 is a section on the line 2—2 of Fig. 1; and

Fig. 3 is a perspective view of one of the plates shown in Figs. 1 and 2.

Like parts are indicated by like symbols throughout the specification and drawing.

Referring to the drawing, 1 generally indicates any suitable base or frame structure having an upward extension 2 in which may be mounted pivotal means 3 for supporting a plurality of jaws generally indicated as 4, 5. The details of the jaws do not of themselves form part of the present invention but I illustrate each jaw as including forward webs 6 and rearward webs 7, in general parallelism and connected at their upper ends by tubular struts 8. Each forward web 6 has an enlargement 9 therein, provided with an aperture 10 having opposite inclined walls 11.

12 indicates a plate body shown in Fig. 3 and at the right hand of Fig. 1 as bounded by the flat generally parallel faces 13, 14, the face 14 forming the crushing face. The plate may be formed of manganese steel or any other suitable material, but manganese steel is an advantageous material because of its resistance to wear. It has, however, the disadvantage of deforming or peening under a crushing pressure. My plate and the means for securing it are advantageous in that they permit a measure of such deformation or spreading of the plate without effecting a locking of the plate in position.

15 is a rearward extension from the plate having opposed inclined edges or beveled portions 16. The portion 15 fits in the aperture 10 and the faces 16 are opposed to and conform generally to the inner inclined faces 11 of the aperture 10. It will be observed that a clearance is provided as at 17, it being preferable that the inner face of the member 15 does not contact the bottom of the aperture 10 at any normal adjustment of the securing means.

20 indicates an insert in the rearward extension 15, such insert being preferably of material free from the peening or deforming characteristics of the manganese steel of which the rest of the plate is made, and more easily machinable. The insert 20 is herein shown as provided with a plurality of screw-threaded apertures 21 adapted to receive the threaded ends 23 of the locking screws 24 headed as at 25, which screws pass through apertures 26 and 27 in the web 5 and the enlarged portion 9, respectively. 28 are any suitable washers or adjusting members.

It will be understood that in response to rotation of the screws 24 the enlarged portion 15 is drawn into the aperture 10 and the manganese portions *a* and *b* are compressed between the insert 20 and the opposed walls 11 of the aperture 10. Thus the central portion of the plate is firmly drawn into position and the parts are so proportioned that the rear face 13 is thereby urged against the opposed face of the web 6.

In order to provide even contact and seating of the parts and to prevent the necessity of machining in the angles between the member 15 and the rear face of the plate 12, I form the plate with recesses 30, 31. The upper and lower edges of the plate 12 are provided with screw-threaded inserts 32 which serve as means for attaching screws or the like when it is desired to support the plate for movement into or out of its location in the jaw.

Referring to the jaw plate shown at the left hand of Fig. 1, illustrated as 12*a*, it will be understood that it differs from the jaw plate 12 in that it is bowed to provide spaces 40 between its rear face and the opposed face of the web 6. Its rearward extension 15 is thickened as at 41 to bridge the spaces 40. The edges of the plate are flattened as at 42 to be opposed to the face of the web 6.

It will be realized that whereas I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and my drawing to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

For instance, whereas I illustrate one plate as flat and the other plate as bowed, it will be understood that both plates may be bowed or both

may be flat, depending upon the need of the particular crusher and the proportions of its jaws. It will be further understood that any intermediate degree of bowing may be employed, or that a more deeply bowed plate may also be employed, if found desirable.

The use and operation of my invention are as follows:

In the employment of wearing parts for jaw crushers, manganese steel is a particularly efficient material in that it stands up better than most steels against the terrific pounding to which the jaw surfaces are subjected in the course of the normal crushing operation.

It will be understood that in use one jaw, generally indicated as A, is normally fixed and the other jaw, indicated as B, is normally moved in a rotary oscillation about the axis 3 by any suitable means which do not form part of the present invention. Thus the jaw plate 12 is moved toward and away from the jaw plate 12*a*, the particles undergoing crushing being thrown downwardly into the top of the crushing space between the two jaws and being subjected to the ensuing crushing nip.

In practice, there is an excess of wear which, depending upon the angle of the jaw and plate and the movement of the jaw, may be greater at the top or at the bottom. Regardless of which is the area of maximum wear, the wear is almost certain, in practice, to be uneven. The jaw plates herein described are preferably made reversible so that the lower edge for example, after an interval of wear, may be positioned at the top instead of at the bottom of the crushing jaw. The result is a substantial saving of metal. The rearwardly extending portion 15 serves as a reinforcement and a strengthening for the central portion of the jaw, and also as a securing means.

Since the securing takes place at an intermediate portion of the jaw, the edges or ends are free and may spread slightly under the hammering action of the crushing operation without in any way affecting their attachment to the jaw proper. It will be observed that the inserts 20 cannot pull out because of their beveled shape, and the manganese as at *a* and *b* is firmly drawn inwardly against the inclined faces 11 of the apertures 10 a distance sufficient to hold the rear face of the jaw 12 or the upper and lower edges of the jaw 12*a* in firm contact with the opposed faces of the webs 6.

I claim:

1. In combination with a crusher jaw having an extended face and a horizontal recess therein, having upper and lower rearwardly converging faces, a metal crusher plate having the general characteristics of manganese steel as to ductility under crushing stress, and as to resistance to wear, impact and abrasion and including a body having free upper and lower edges and a rearward, horizontally extending, enlargement substantially equi-distant from top and bottom of said body and extending across a major portion of the width of the plate, said rearward enlargement being provided with upper and lower rearwardly converging wedge faces conforming generally to, and engaging, the converging faces of the jaw recess, said enlargement being normally out of contact with the inner face of said recess, and means for urging said enlargement into wedging contact with the upper and lower faces of said recess.

2. In combination with a crusher jaw having an extended face and a horizontal recess therein, having upper and lower rearwardly converging faces, a metal crusher plate having the general characteristics of manganese steel as to ductility under crushing stress, and as to resistance to wear, impact and abrasion and including a body having free upper and lower edges and a rearward, horizontally extending, enlargement substantially equi-distant from top and bottom of said body and extending across a major portion of the width of the plate, said rearward enlargement being provided with upper and lower rearwardly converging wedge faces conforming generally to, and engaging, the converging faces of the jaw recess, said enlargement being normally out of contact with the inner face of said recess, and means for urging said enlargement into wedging contact with the upper and lower faces of said recess, including insert means of a machinable metal different from the metal of which the plate is composed, secured in said enlargement and a bolt screw-threaded therein and extending rearwardly through the jaw.

3. For use with a crusher jaw having an extended surface and a horizontally extending cavity in said surface, defined by upper and lower rearwardly converging faces, a crusher plate of a metal having generally the same characteristics of manganese steel as to ductility under crushing stress, and as to resistance to wear, impact and abrasion, said plate having free upper and lower edges adapted to engage said extended jaw surface and a single central wedge member adapted to penetrate said cavity in the jaw, said central wedge member being substantially equi-distant from the top and bottom of the plate and being defined by upper and lower rearwardly converging plane faces adapted to conform generally to and engage the converging faces of the cavity, said wedge member extending across a major portion of the width of the plate.

4. For use with a crusher jaw having an extended surface and a horizontally extending cavity in said surface, defined by upper and lower rearwardly converging faces, a crusher plate of a metal having generally the same characteristics of manganese steel as to ductility under crushing stress, and as to resistance to wear, impact and abrasion, said plate having free upper and lower edges adapted to engage said extended jaw surface and a single central wedge portion adapted to penetrate said cavity in the jaw, said central wedge portion being substantially equi-distant from the top and bottom of the plate and being defined by upper and lower rearwardly converging plane faces adapted to conform generally to and engage the converging faces a substantial part of the width of the plate, and having secured therein an insert of a machinable metal different from the metal of which the plate is composed, having therein one or more screw-threaded apertures adapted to receive securing members.

OSCAR C. GRUENDER.