Jan. 8, 1935. G. BUCHANAN 1,987,360

CRUSHER CONSTRUCTION

Filed Aug. 17, 1933

Fig. 1.

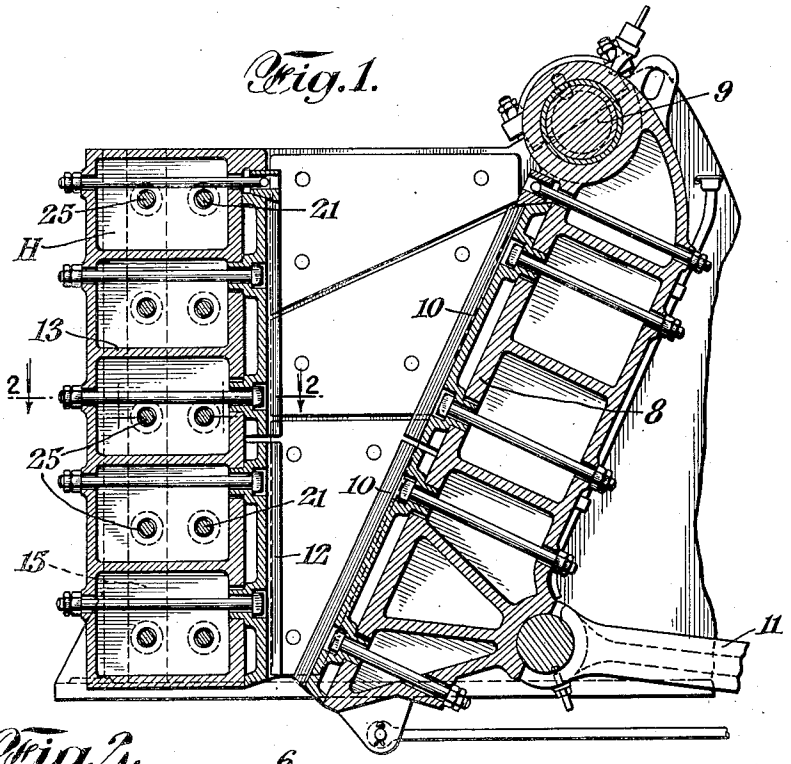


Fig. 2.

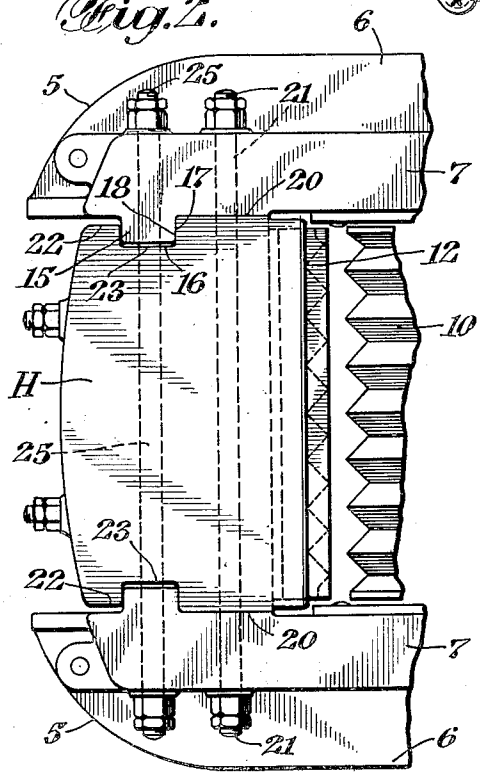
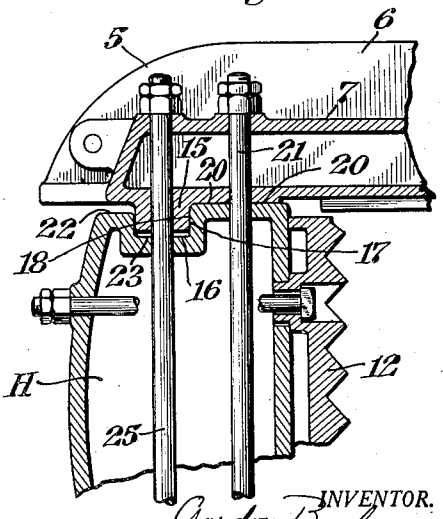


Fig. 3.



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CRUSHER CONSTRUCTION

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3 Claims. (Cl. 83—53)

This invention relates to crushers and particularly to the frame and head construction of jaw crushers for rock, ore and the like.

In such crushers the side frame members are separate from the heads which are assembled in place between the ends of the side members. The full crushing forces transmitted between the head and the side members subject the connection between these parts to severe and highly variable stresses, tending to bend, shear and tear the members at any point of weakness. This is particularly true when the construction is such that the necessary yielding or flexing of the parts under strain tends to localize and concentrate the crushing forces along a particular line or area.

The object of this invention is to provide a crusher frame structure connecting the separate head and side members strongly and rigidly together and so combining the parts as to distribute the stresses and avoid any tendency toward concentration of strains at particular areas.

In the accompanying drawing illustrating one embodiment of the invention.

Fig. 1 is a vertical sectional view through the head and crusher jaw,

Fig. 2 is a plan view of the head and ends of the side members, and

Fig. 3 is a horizontal sectional view taken on the line 2—2 of Fig. 1 and looking in the direction of arrows.

In the drawing only the crushing end of the machine is shown with the side frame members 5—5 extending substantially parallel with wide foot flanges 6 and vertical sides 7 of hollow construction (Fig. 3) reinforced and webbed as desired. These side members 5 support an oscillatory crusher jaw 8 on shaft 9, the crushing surfaces of the jaw being provided by the manganese steel face plates 10 and toggle link 11 of toggle mechanism (not shown) imparts a limited adjustable oscillatory movement to the jaw 8 around the center of the shaft 9.

The head H is fitted between the ends of the side frame members 5 as shown and carries the manganese steel crushing plates 12 cooperating with the plates 10 of the jaw 8. This head H is of the box type of hollow formation and having horizontal and vertical webs 13 giving a strong stiff construction.

In the structure of this invention the side frame members and head are combined together by a connection forming them into a rigid unitary structure of great strength. The side frame members are provided with projections 15 in the form of long strips or ridges extending from the top to the bottom of the members near their ends, and the head H is correspondingly grooved at 16. Strips or ridges 15 provide the thrust shoulders 17 receiving the crushing forces from the side surface 18 of the head grooves 16. Between these shoulders and the crushing face of the head H the surfaces of the side frames and the head H at 20 are tightly fitted and compressed together by the cross bolts 21, the rear portion of the head at 22 and 23 being narrowed so as to avoid side contact with the adjacent surfaces of the side face and to confine the compression to the vertical strips 20 between the thrust shoulders and the crushing surfaces of the head. The entire side thrust between the side members and the side surfaces of the head is thus localized at these surfaces 20, and these parts are placed under initial high compression and clamped tightly together under the tension of the cross bolts 21, this tension being made sufficient to so rigidly clamp the parts together as to combine the front portion of the head and the adjacent portions of the side frames into a substantially integral cross member in front of the thrust shoulders 17.

Further compression between these parts is also provided by the cross bolts 25 extending through the ridge members 15 and grooves 16 as shown, and also placed under initial tension so as to clamp the side frames tightly against the sides of the head along the surfaces 20. The ends of the side frames and the front portion of the head H are thus combined into a substantially integral structure with the surfaces of the head at 20 under heavy initial compression.

In service the longitudinal crushing forces are directly transmitted from the head H to the shoulder surfaces 18 of the strip members 15 on the side frames. Flexure of the parts is minimized and resisted by the rigid construction of the side frames and the head H and by the combined reinforcement effected through the close clamping of the front end of the head and the side frames between the thrust shoulders and the thrust surfaces of the head. Such flexure as does occur only increases the clamping pressures between these parts and maintains the distribution of the stresses without tendency to concentrate these stresses at any point. In this way the repeated shocks and vibrations to which these parts are subjected in service do not involve any over straining, and consequently all liability to fatigue of the metal at any point is prevented and the parts are permanently strong and durable.

The members are simple in formation with all

fitting surfaces readily accessible for machining, and the structure combines lightness with strength and durability.

I claim.

1. In a crusher frame the combination with side members, of a crusher head between the ends of said side members, a transverse surface carried by said head to receive the crushing stresses, connections between said head and said side members comprising transverse thrust surfaces between said head and said side members to transmit the crushing stresses from said surface to said side members, engaging surfaces between said side members and said head extending longitudinally and wholly positioned between said thrust receiving and thrust transmitting surfaces so that the transversely opposing faces of the head and side members on the other side of said transverse thrust surfaces are maintained out of contact, and means for applying transverse pressure to said side members to maintain said engaging surfaces under predetermined initial compression.

2. In a crusher frame the combination with side members, of a crusher head between the ends of said side members, a transverse surface carried by said head to receive the crushing stresses, connections between said head and said side members comprising transverse thrust surfaces between said head and said side members to transmit the crushing stresses from said surface to said side members, engaging surfaces between said side members and said head extending longitudinally and wholly positioned between said thrust receiving and thrust transmitting surfaces so that the transversely opposing faces of the head and side members on the other side of said transverse thrust surfaces are maintained out of contact, and means for applying transverse pressure to said side members to maintain said engaging surfaces under predetermined initial compression, said pressure applying means comprising bolts extending transversely through said engaging surfaces between said transverse thrust surfaces and said transverse crushing surface.

3. In a crusher frame the combination with side members, of a crusher head between the the ends of said side members, a transverse surface carried by said head to receive the crushing stresses, connections between said head and said side members comprising transverse thrust surfaces between said head and said side members to transmit the crushing stresses from said surface to said side members, engaging surfaces between said side members and said head extending longitudinally and wholly positioned between said thrust receiving and thrust transmitting surfaces so that the transversely opposing faces of the head and side members on the other side of said transverse thrust surfaces are maintained out of contact, means for applying transverse pressure to said side members to maintain said engaging surfaces under predetermined initial compression, said pressure applying means comprising bolts extending transversely through said engaging surfaces between said transverse thrust surfaces and said transverse crushing surface, and separate bolting means extending through said head and side members on the opposite side of said transverse thrust surfaces.

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