

Aug. 2, 1938.

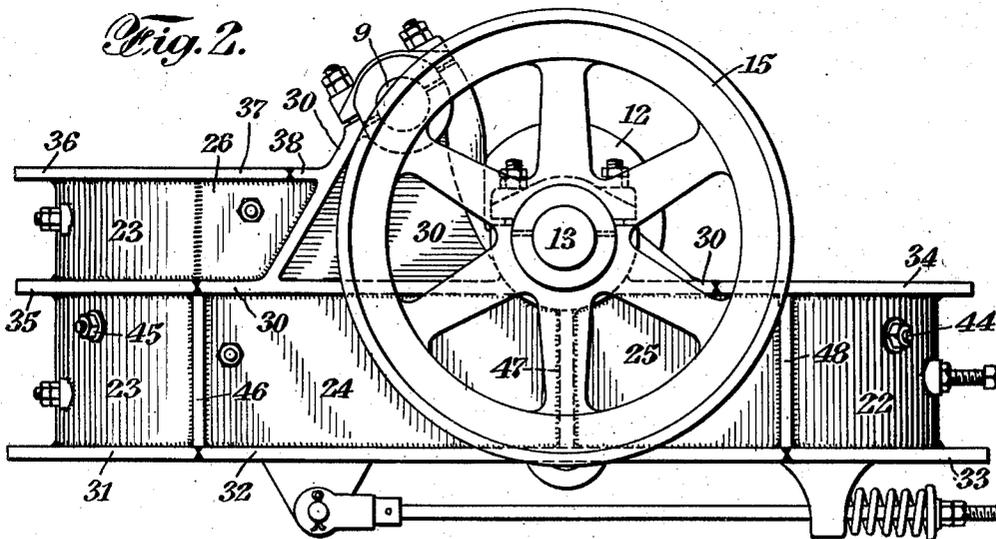
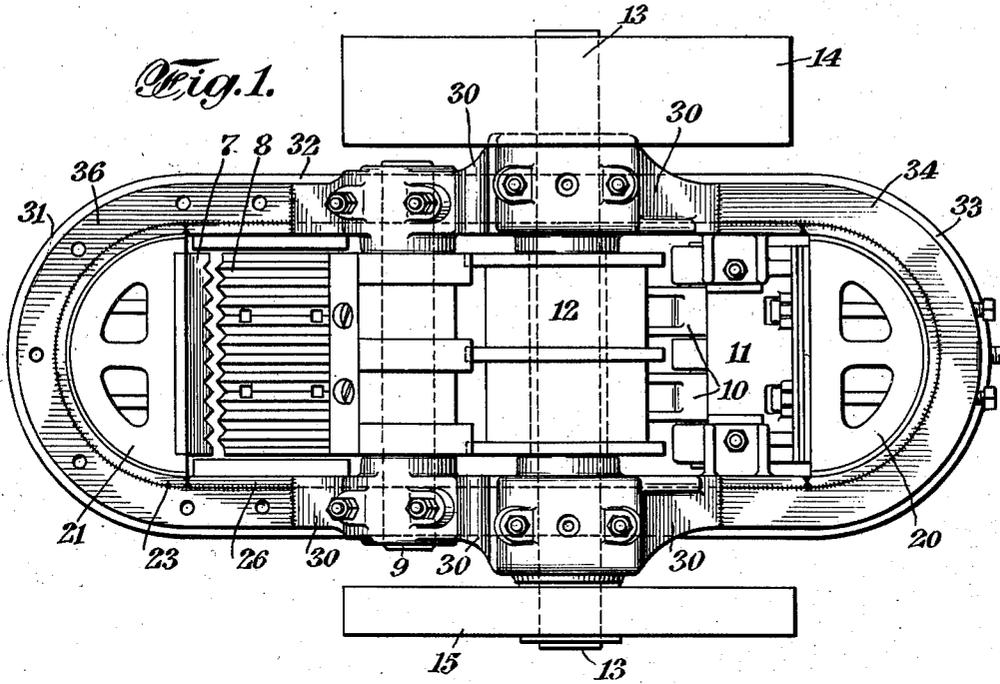
G. BUCHANAN

2,125,666

CRUSHER FRAME

Filed Feb. 14, 1934

2 Sheets-Sheet 1



INVENTOR
Gordon Buchanan
BY
Edward Power & Co.
ATTORNEYS

Aug. 2, 1938.

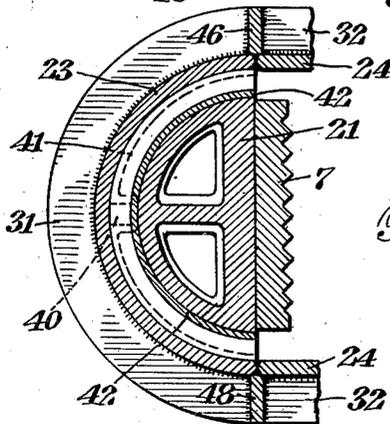
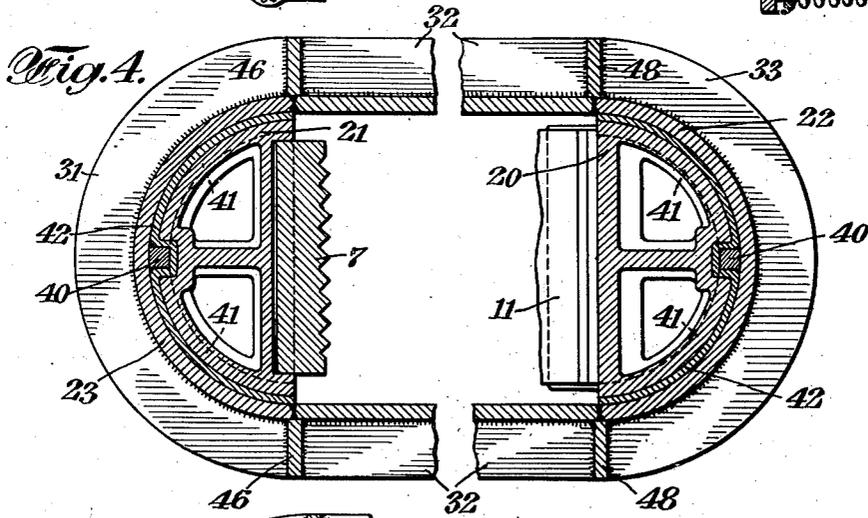
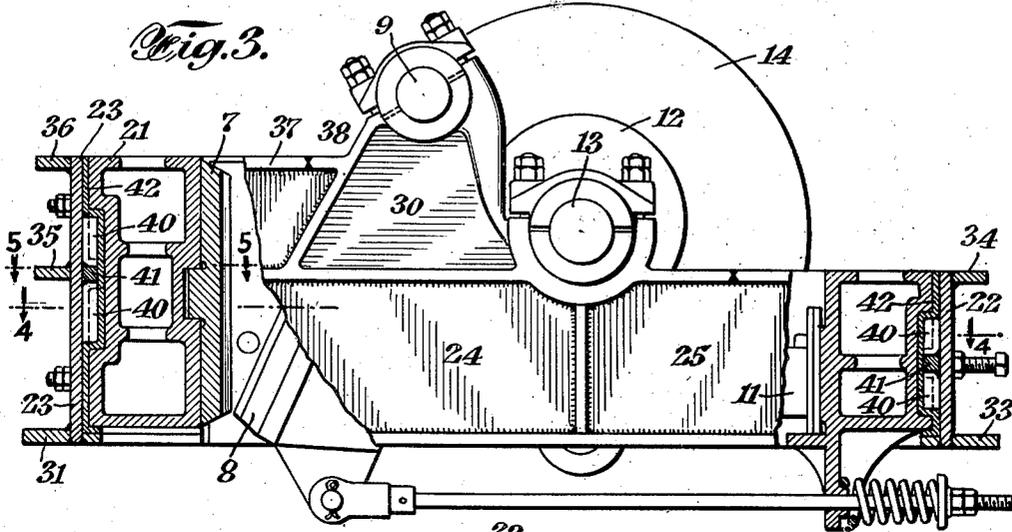
G. BUCHANAN

2,125,666

CRUSHER FRAME

Filed Feb. 14, 1934

2 Sheets-Sheet 2



INVENTOR
Gordon Buchanan
BY
Edward J. Powers & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE

2,125,666

CRUSHER FRAME

Gordon Buchanan, East Orange, N. J., assignor
to Pennsylvania Crusher Company, Philadel-
phia, Pa., a corporation of New York

Application February 14, 1934, Serial No. 711,178

3 Claims. (Cl. 83-53)

This invention relates to crushing apparatus and particularly to crushers of the oscillatory jaw type in which a stationary jaw is opposed by a swinging jaw and operated by eccentric and toggle mechanism between the jaw and the opposite end of the frame.

In such apparatus the frame is commonly made of an integrally cast unit or an assembly of cast side and end members bolted together. Such constructions are complicated and cumbersome and tend to develop weaknesses due to the intricate nature of the stresses set up in the various parts.

The object of this invention is to provide a crusher frame which will combine all parts together in a unitary integral structure reducing the main crushing stresses to simple tensions, and mounting the drive and jaw support by parts specially constructed and fitted with the remainder of the frame to carry the compression and torsional forces developed by these portions of the operating mechanism.

Further objects of the invention particularly in the construction of the crusher frame from interfitted units welded together will appear from the following description taken in connection with the drawings in which—

Fig. 1 is a plan view of a crusher embodying the invention,

Fig. 2 is a side elevation of the crusher shown in Fig. 1,

Fig. 3 is a view similar to Fig. 2 but showing the ends of the crusher in vertical longitudinal section,

Fig. 4 is a partial horizontal sectional view taken on the line 4-4 of Fig. 3, and

Fig. 5 is a partial horizontal section of one end of the machine taken on the line 5-5 of Fig. 3.

In the specific embodiment of the invention shown in the drawings the crusher carries the fixed jaw 7 and the oscillatory jaw 8 supported by the shaft 9 and operated by toggle mechanism indicated generally at 10. The rear end of the machine carries the tail block 11 on the rear head 20 and the toggle mechanism is operated by the pitman 12 on shaft 13 driven by the pulley wheel 14 carrying the flywheel 15. The front head is shown at 21 and the longitudinal crushing stresses are in opposite directions tending to drive these heads outward and away from each other. To support the operating mechanism and hold the parts in place against crushing stresses, a frame member is provided built up of interfitting parts integrally welded together. The ends of the frame are semi-circular in formation and com-

prise end plates 22 and 23 of rolled steel bent flatwise and welded at their ends to the side plates 24 and 25 also of rolled steel and welded together at their ends adjacent the center of the machine. The end plate 23 is higher than the end plate 22 and is welded at its ends to the flat panels 26 on each side, these panels in turn being welded to the interfitting surfaces of the steel casting 30 carrying the bearings for the shafts 9 and 13.

A base flange for the frame is provided by the side strips 32 welded to the lower portions of the side plates 24 and 25 as shown, and also welded at their ends to the end flanges 31 and 33 of rolled steel strips bent into semi-circular form and welded to the lower edges of the end plates 22 and 23.

The upper edge of the end plate 22 and the intermediate portion of the end plate 23 are provided with flanges 34 and 35 respectively welded to these plates as shown in semi-circular form. The casting 30 is supported on the side plates 24 and 25 and welded thereto as shown and also welded at its lower flanged ends to the end flanges 34 and 35. An upper flange 36 extends around the upper edge of the end plate 23 in semi-circular form and with its extended ends 37 welded to the panel plates 26 and also welded to the flanges 38 of the castings 30 on each side.

The heads 20, 21 fit within the end plates 22 and 23 and these plates carry welded thereto the vertical strips 40 and the horizontal strips 41 adapted to extend into corresponding groove formations in the heads. An interlining of metal 42 poured in in molten form between the end plates and the heads fills the spaces between these parts. In this way the heads are held against slipping or sliding around with relation to the supporting end plates. Bolts 44, 45 are provided in holes drilled through the end and head parts and tensioned to clamp the heads in their settings in the end plates. Vertical strut strips 46, 47, 48 are provided on each side extending upward between the flanges and welded in place along the lines of the welds between the plates 22, 23, 24 and 25.

The crusher frame provided by the unitary construction of this invention is light and strong and durable. The longitudinal stresses of the crushing forces are resolved by the end constructions into purely tensional forces in the support frame structure. The plates 22, 23, 24 and 25 form a closed loop with flattened sides, and these members and the correspondingly shaped flanges take the crushing forces in tension and without any compression or shearing or tearing strains. The

castings 30 supporting the shafts 9 and 13 take all of the compressive forces exerted by the weights and reactions and the parts carried by these shafts, these forces being evenly distributed from the castings to the welded frame members. With this combination the heavy crushing tensions are taken entirely by the welded construction assembling the rolled steel plates end to end, while the weights of the movable parts and the reactions from the jaw and eccentric shafts are taken by the solid steel castings 30 which also rigidly position these shaft centers with relation to each other. The area of welding between the frame and the casting 30 is extended laterally to give a wide base support for the casting and to distribute the stresses and avoid concentration at any point.

In this symmetrical frame construction the strains under the stresses of service are accurately predeterminable and all of the parts are readily designed to operate safely within their elastic limits. The structure is, therefore, dependable and durable in service while at the same time of light weight in proportion to its size and capacity.

I claim:

1. In a crusher construction the combination with a frame having straight side plates and end plates welded together to form a continuous normally unstressed loop, at least one of said end plates being semi-circular in horizontal section, front and rear heads fitting the inner end surfaces of said frame and having flat thrust receiving surfaces extending transversely across the frame, a pivoted jaw and operating means therefor, separate mountings for said jaw and operating means carried by said side plates, said heads being separately and independently mounted in said frame without initial stresses between them, and interlocking means between said semi-cir-

cular end plate and the corresponding head preventing relative rotational movement between them.

2. In a crusher construction the combination with a frame having straight side plates and semi-circular end plates welded together to form a continuous normally unstressed loop, of front and rear heads having semi-circular surfaces fitting the inner semi-circular surfaces of said frame, and having flat thrust receiving surfaces extending transversely across the frame, a pivoted jaw and operating means therefor, separate mountings for said jaw and operating means carried by said side plates, said heads being separately and independently mounted in said frame without initial stresses between them, and interlocking means between said heads and said end plates preventing relative rotational movement between them.

3. A crusher comprising a frame including end walls of sheet metal having a smooth continuous curved contour on their inner faces, straight side walls of sheet metal forming integral continuations of the end walls and tangent to the curves of said end walls, heads mounted on the end walls and having outer faces fitting continuously the curved inner faces of the end walls between the junctions of the end walls with the side walls, and crushing mechanism mounted on the frame including means transmitting crushing thrust to the heads in the direction of the end walls, a drive shaft, a pivoted crusher jaw, and trunnion supports for said jaw and shaft constructed to withstand the compression stresses exerted at said trunnions during operation and mounted on the side walls, the construction and arrangement being such that said thrust is transmitted by the heads to the frame as tension.

GORDON BUCHANAN.