

Sept. 26, 1939.

G. A. BILOCQ

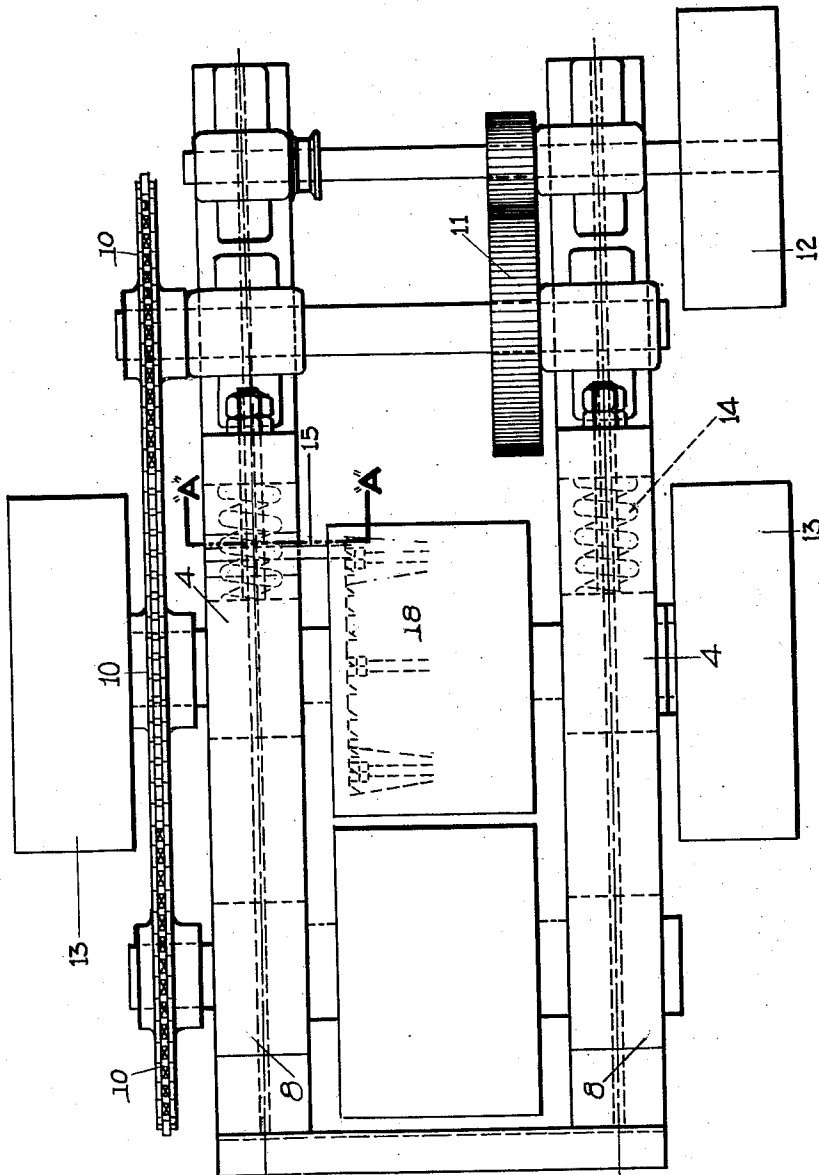
2,174,116

STONE CRUSHER

Filed May 28, 1937

2 Sheets-Sheet 1

FIG-1



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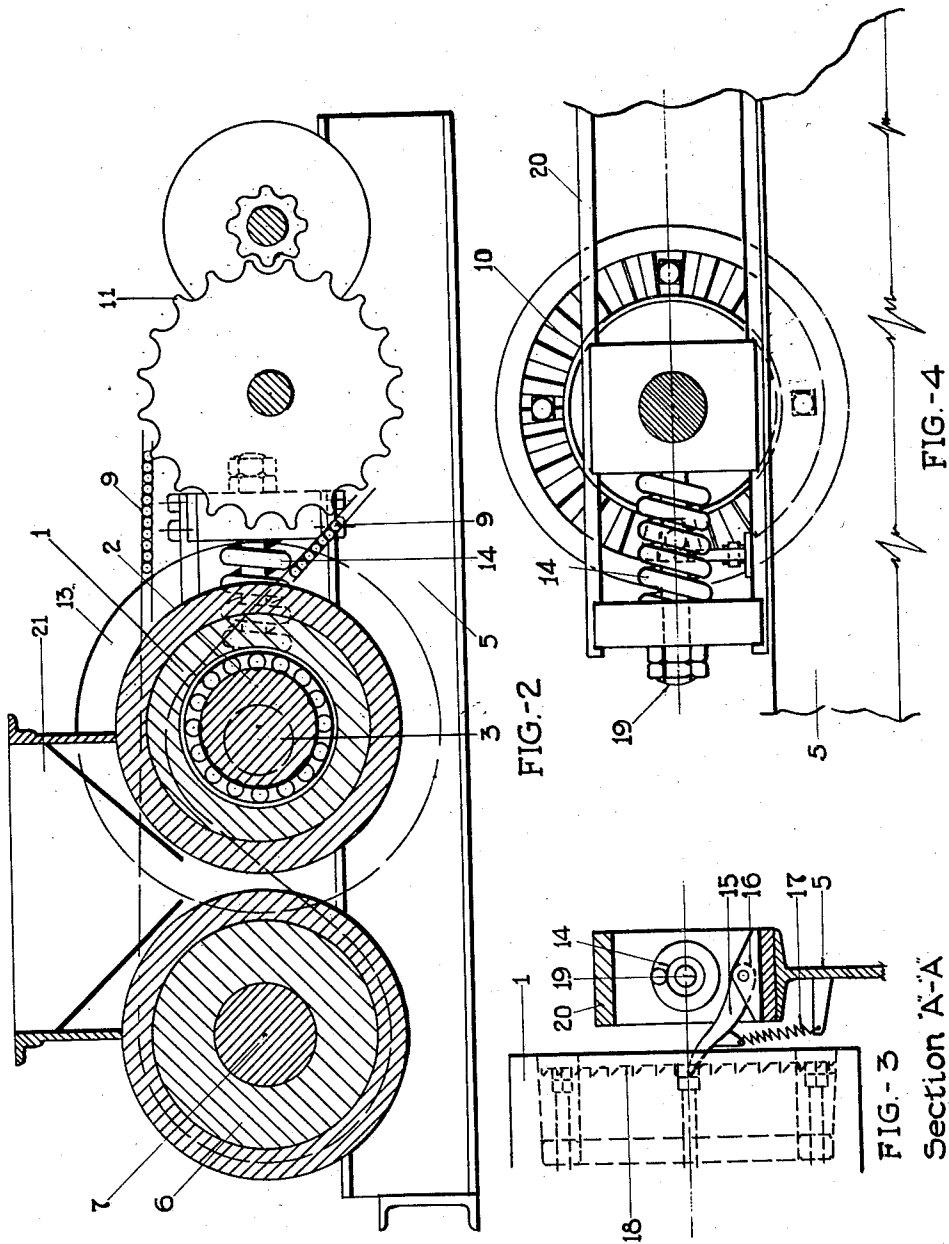
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2 Sheets-Sheet 2



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STONE CRUSHER

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8 Claims. (Cl. 83—12)

My invention relates to improvements in stone crushers which include a reciprocating or oscillating horizontally disposed crushing drum and a rotating drum associated with it in such a manner that the material to be crushed is fed into a crushing zone between the two drums. The objects of my improvements are to provide a more uniform crushing of the stone with less refuse and a better efficiency in crushing operations.

I attain these objects by the mechanism illustrated in the accompanying drawings in which:

Figure 1 is a plan of the machine.

Figure 2 is a longitudinal section of the machine.

Figure 3 is a section on line AA on Figure 1 to show in detail the device to secure a positive rotation of the oscillating drum.

Figure 4 is a side elevation of said device.

Similar numbers refer to similar parts throughout the several views.

The drum 1 rotates freely around the eccentric 2 mounted on the shaft 3 turning in the bearings 4 fixed in the frame 5. The drum 6 is mounted on the shaft 7 turning in the bearings 8. These shafts 3 and 7 are driven by a chain 9 through sprocket wheels 10 or by a convenient gearing. The chain is driven through a speed-reducing gear 11 by the pulley 12. Fly wheels 13 properly counterpoised counterbalance the eccentricity of the drum 1. Springs 14 permit the sliding of the bearings 4 to allow the passage between the drums of any unbreakable body that may happen to fall between the drums and also maintain the distance between the drums which is regulated by the bolts 19.

The device which ensures the positive rotation of the oscillating drum is shown in detail in Figures 3 and 4, where 15 represents a pawl pivoting on a base 16 fixed on the frame 5 and maintained by a spring 17 against a ratchet-like series of grooves 18 cut in the side of the drum 1. Those grooves 18 are long enough to permit the pawl 15 to keep engaged during the complete oscillation of the drum 1.

In the several views, 19 is a bolt provided to regulate the distance between the two drums through the sliding motion of bearing boxes 4; 20 is a plate which reinforces the bearing boxes of the machine; 21 is a hopper through which the stones are fed; this hopper 21 is not shown on the plan for the sake of simplicity.

The stone is fed through the hopper between the drums 1 and 6; the drum 6 rotates continuously and regularly. The drum 1 rotates freely

around the eccentric part 2 and when no stones are fed will by friction follow the motion of the shaft 3. As soon as stones are fed in the hopper 21 the rotation of drum 1 is slowed down. When too many stones are fed, it may happen that the drum 1 will rotate in a direction opposite to the rotation of shaft 3 and the stones will not pass between the drums. It is in order to prevent this occurrence, which lowers the efficiency of the machine, that I provide the positive action of the drum 1.

Shaft 3 rotates three times as fast as shaft 7 but this relation is not absolute and may be adjusted to obtain the best results according to the material to be crushed.

I am aware that prior to my invention stone crushers have been made in which the stone was crushed between two rollers and also in which an oscillating drum has been employed and I therefore do not claim these features; but

I claim:

1. In a stone crusher, the combination of a frame, a pair of parallel shafts, one rotating in fixed bearings and the other in slidable bearings permitting movement of the same toward and from the first-named shaft, a rotary crushing roll fixed to and rotating with the first-named shaft, an eccentric on the second-named shaft, a drum surrounding the eccentric and rotatable in frictional engagement with and also oscillatable about said eccentric, said drum and roll having peripheral surfaces in coacting relationship for the crushing of stone fed therebetween, means for permitting oscillation of the drum about the eccentric and limiting the backward rotation thereof, and means connected to both shafts for directly driving each shaft.

2. In a stone crusher, the combination of a frame, a pair of parallel shafts, one rotating in fixed bearings and the other in slidable bearings permitting movement of the same toward and from the first-named shaft, a rotary crushing roll fixed to and rotating with the first named shaft, an eccentric on the second-named shaft, a drum surrounding the eccentric and rotatable in frictional engagement with and also oscillatable about said eccentric, said drum and roll having peripheral surfaces in coacting relationship for the crushing of stone fed therebetween, means for permitting oscillation of the drum about the eccentric and limiting the backward rotation thereof, and gearing for directly driving each shaft and driving the second-named shaft at a greater speed than the first-named shaft.

3. In a stone crusher, the combination of a

frame, a pair of parallel shafts, one rotating in fixed bearings and the other in slidable bearings permitting movement of the same toward and from the first-named shaft, a rotary crushing roll fixed to and rotating with the first-named shaft, an eccentric on the second-named shaft, a drum surrounding the eccentric and rotatable in frictional engagement with and also oscillatable about said eccentric, said drum and roll having peripheral surfaces in coacting relationship for the crushing of stone fed therebetween, means for permitting oscillation of the drum about the eccentric and limiting the backward rotation thereof, said means comprising a pawl on the frame and ratchet teeth extending radially on the drum and elongated in the radial direction for engagement of the pawl with any position of the drum in its rotations with respect to the roll, and means connected to both shafts for directly driving each shaft.

4. In a stone crusher, the combination of a frame, a pair of parallel shafts, one rotating in fixed bearings and the other in slidable bearings permitting movement of the same toward and from the first-named shaft, a rotary crushing roll fixed to and rotating with the first-named shaft, an eccentric on the second-named shaft, a drum surrounding the eccentric and rotatable in frictional engagement with and also oscillatable about said eccentric, said drum and roll having peripheral surfaces in coacting relationship for the crushing of stone fed therebetween, means for permitting oscillation of the drum about the eccentric and limiting the backward rotation thereof, sprockets fixed to the shafts, and an endless chain for directly driving said gears, the gear on the drum shaft being relatively smaller than that on the roll shaft for driving said drum shaft at a higher rate of speed than the roll shaft.

5. In a stone crusher, the combination of a frame, a pair of parallel shafts, one rotating in fixed bearings and the other in slidable bearings permitting movement of the same toward and from the first-named shaft, a rotary crushing roll fixed to and rotating with the first-named shaft, an eccentric on the second-named shaft, a drum surrounding the eccentric and rotatable frictionally in engagement with and also oscillatable about said eccentric, said drum and roll having peripheral surfaces in coacting relationship for the crushing of stone fed therebetween, means for permitting oscillation of the drum about the eccentric and limiting the backward rotation thereof, sliding bearings in which the drum shaft is mounted for movement of said shaft and drum forward and rearward toward and from the roll shaft and roll, springs acting on said bearings for normally moving the drum and drum shaft toward the roll and roll shaft and yieldingly resisting reverse movement thereof, adjustable means for variably limiting the movement of the drum and drum shaft in the first-named direction, and means connected to both shafts for directly driving each shaft.

6. In a stone crusher, the combination of a

frame, a pair of parallel shafts, one rotating in fixed bearings and the other in slidable bearings permitting movement of the same toward and from the first-named shaft, a rotary crushing roll fixed to and rotating with the first-named shaft, an eccentric on the second-named shaft, a drum surrounding the eccentric and rotatable in frictional engagement with and also oscillatable about said eccentric, said drum and roll having peripheral surfaces in coacting relationship for the crushing of stone fed therebetween, means for permitting oscillation of the drum about the eccentric and limiting the backward rotation thereof, said means comprising a pawl on the frame and ratchet teeth extending radially on the drum and elongated in the radial direction for engagement of the pawl in any position of the drum in its rotations with respect to the roll, and means connected to both shafts for directly driving each shaft.

7. In a stone crusher, the combination of a frame, a pair of parallel shafts, one rotating in stationary bearings and the other in bearings slidable toward and from the first-named shaft, a rotary crushing roll fixed to and rotating with the first named shaft, an eccentric on the second-named shaft, a drum surrounding the eccentric and rotatable in frictional engagement with and also oscillatable about said eccentric, said drum and roll having peripheral surfaces in coacting relationship for the crushing of stone fed therebetween, means for permitting oscillation of the drum about the eccentric and limiting the backward rotation thereof, said means comprising a pawl on the frame and ratchet teeth extending radially on the drum and elongated in the radial direction for engagement of the pawl in any position of the drum in its rotations with respect to the roll, and gearing for directly driving each shaft and driving the second-named shaft at a greater speed than the first-named shaft.

8. In a stone crusher, the combination of a frame, a pair of parallel shafts, one rotating in fixed bearings and the other rotating in bearings slidable toward and from said fixed bearings, a rotary crushing roll fixed to and rotating with the first-named shaft, an annular eccentric sleeve on the second-named shaft, a drum surrounding said eccentric sleeve and having its inner periphery in frictional engagement therewith, said drum being both rotatable and oscillatable about said eccentric sleeve, and said drum and roll being provided with peripheral surfaces in coacting relationship for the crushing of stone fed therebetween, means for permitting oscillation of the drum about the eccentric sleeve and limiting the backward rotation thereof, said means comprising a pawl on the frame and ratchet teeth extending radially on the drum and elongated in the radial direction for engagement of the pawl in any position of the drum in its rotations and oscillations with respect to the roll, and gearing for directly driving each shaft and driving the drum shaft at a greater speed than the roll shaft.

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