Jan. 29, 1963 H. P. KAUTZ 3,075,711

COUNTERBALANCE ASSEMBLY FOR JAW CRUSHERS AND THE LIKE

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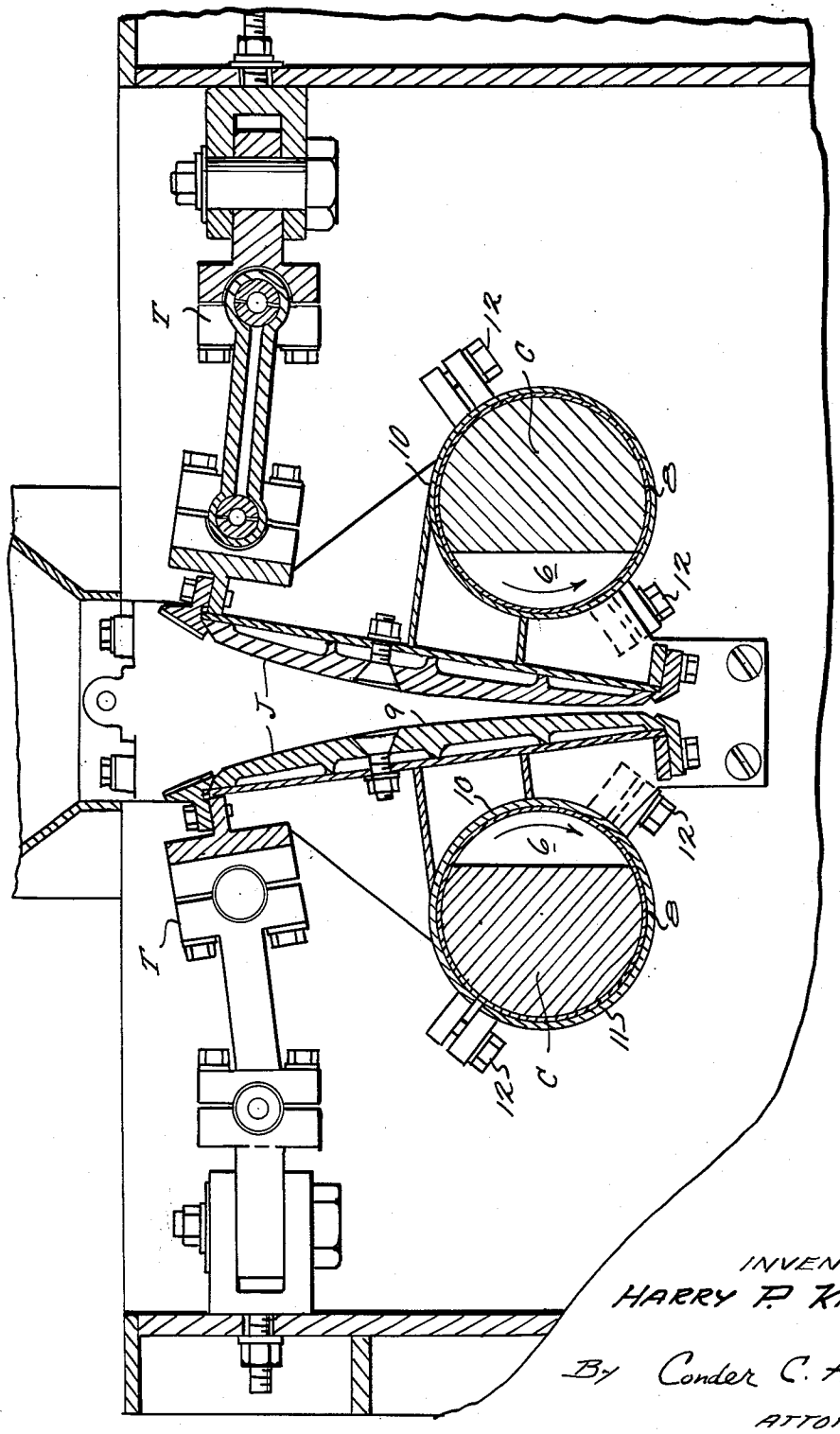


FIG. 1

INVENTOR
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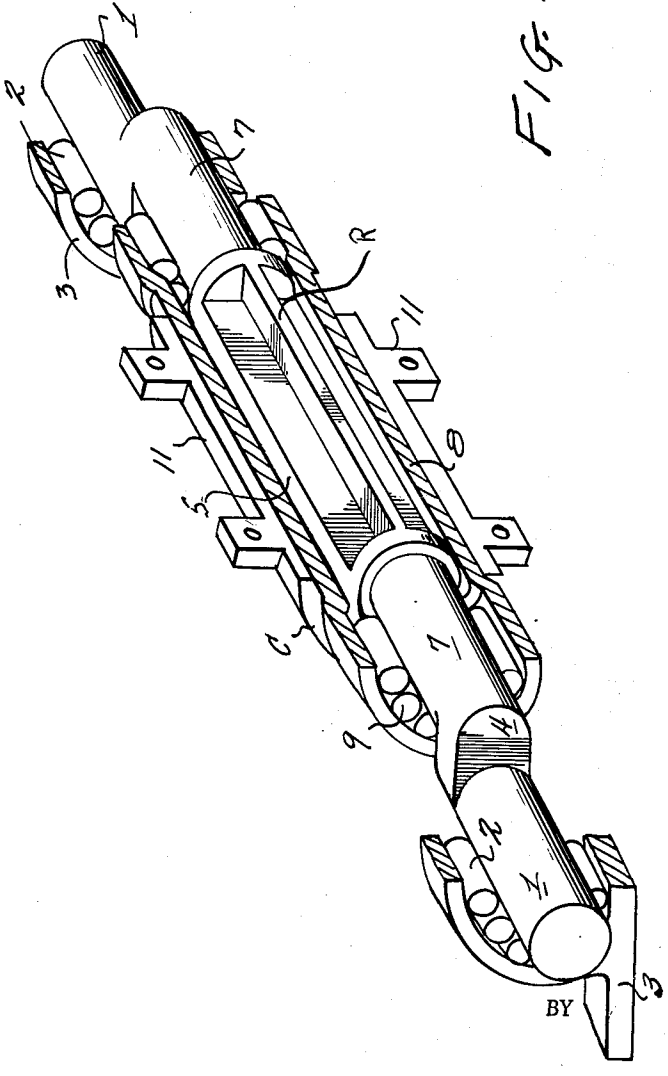
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FIG. 2



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United States Patent Office 3,075,711 Patented Jan. 29, 1963

3,075,711

COUNTERBALANCE ASSEMBLY FOR JAW CRUSHERS AND THE LIKE

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Filed May 8, 1961, Ser. No. 108,635
5 Claims. (Cl. 241—218)

My invention relates to a counterbalance assembly for jaw crushers and the like.

Prior to my invention, jaw crushers have usually been counterbalanced by employing two identical counterweighted flywheels spaced on their common crankshaft at equal distances from the center of crushing, which reduced or eliminated the vibration created by the parts of the machine which are moved by the eccentric. Counterbalancing by any method increases the efficiency and the life of machine parts which include the foundation or other means of support.

The principal object of my invention is to provide an improved method of counterbalancing which eliminates the need for attaching counterweights to flywheels, permitting the use of none or one rather than two flywheels, which were previously required by the dynamic or running balance, thereby reducing the hazard of at least one rotating flywheel, allowing installation in less space, and providing greater latitude for the design and reduced costs of the drives and associated parts, especially those crushers which require two counter-rotating crankshafts being driven at relatively high speed.

The invention is exemplified in the following description and illustrated in the accompanying drawings in which:

FIG. 1 is a vertical sectional view of a jaw crusher showing my counterbalancing crankshaft applied thereto, and

FIG. 2 is a perspective view partly in section of my crankshaft assembly.

Referring in detail to such drawings by reference characters, in which the same characters indicate like parts in both figures, it will be seen that opposed crusher jaws J are provided, which jaws are spaced from each other to allow crushable material to pass downwardly between them. Each of said jaws is mounted on my crankshaft assembly designated generally by the letter C, and such jaws are stabilized and guided at their upper ends by toggle assemblies T. Inasmuch as the crusher jaws and toggle assemblies form no part of the present invention, they will not be further described.

My invention comprises a crankshaft having aligned ends 1 journaled in main roller bearings 2 which are supported on fixed bases 3. The inner portions of such ends are provided with crank cheeks 4 between which extends the eccentric portion of the crankshaft. Such portion as a whole will hereinafter be referred to as the eccentric.

The cylindrical central section 5 of the eccentric or crank throw has an elongated cut-out, that is to say, has metal removed from the side thereof opposite the main bearing center, and substantially throughout its entire length, thus constituting the eccentric as a counterbalance, and the ends 7 of said eccentric are reduced in diameter and form bearing surfaces for roller bearings 9. As will be seen, a reinforcing rib R has been left in the cut-out portion of the eccentric to provide proportionately greater strength for a relatively low loss of counterweight.

Sleeved over the eccentric is a housing 8 having enlarged ends which are supported on said bearings, the housing being slightly spaced from the eccentric at its midsection for clearance and lubrication purposes.

Referring to FIG. 1, it will be seen that affixed to the exterior of each crusher jaw is a clamp, cylindrical in cross section and consisting of a seat 10 and a removable cap 11 secured to the seat by cap screws 12, and that the said housing 8 is nonrotatably clamped between said seat and cap. Also, it will be noted that those portions of the crankshafts from which metal has been removed face each other, thus positioning the crankshafts in phased relationship with respect to each other.

The operation of the device is as follows: Since the jaws J are clamped to the housings 8 and the eccentrics rotate within the housings, the crankshafts, which are rotatable in fixed bearings at their ends, impart an oval motion to the lower ends of the jaws, and since metal has been removed from the central cylindrical sections of the eccentrics, which are disposed in phased relationship with respect to each other, and the metal was removed at the center line of crushing between eccentric bearings, both static, dynamic and standing balance is provided for without the use of two symmetrically located counterbalanced flywheels.

While I have disclosed my invention as applied to the jaws of a jaw crusher, it will be understood that the same is applicable to other mechanisms having movable parts which need to be counterbalanced.

Having thus described my invention, I claim:

1. A crankshaft having main bearing surfaces at the ends thereof and an eccentric section between said surfaces, the said crankshaft having metal removed from said eccentric section only and at the exterior portion thereof between said bearing surfaces for counterbalancing purposes.

2. The article of manufacture as claimed in claim 1 wherein a reinforcing rib is provided in and extends through the zone of the section where metal has been removed.

3. As a subcombination, an assembly for a machine comprising a crankshaft, main bearing surfaces at the ends thereof and an eccentric section between said surfaces, the said crankshaft having metal removed from said eccentric section only and at the exterior portion thereof between said bearing surfaces for counterbalancing purposes; a housing movably supported on said eccentric section whereby said eccentric section may be rotated within said housing and impart movement thereto, and means whereby said housing may be rigidly secured to a movable element of said machine.

4. The subcombination as recited in claim 3 in which said machine is a jaw crusher and the movable element of said machine is the jaw of said crusher.

5. A crankshaft for a jaw crusher having aligned ends adapted to be journaled in fixed bearings, the said crankshaft being provided with crank cheeks and an eccentric section extending between said cheeks, the said crankshaft having metal removed from said eccentric section only and on the exterior portion thereof for counterbalancing purposes.

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