

Dec. 30, 1958

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2,866,605

MACHINE FOR CRUSHING STONE AND THE LIKE

Filed June 7, 1957

2 Sheets-Sheet 1

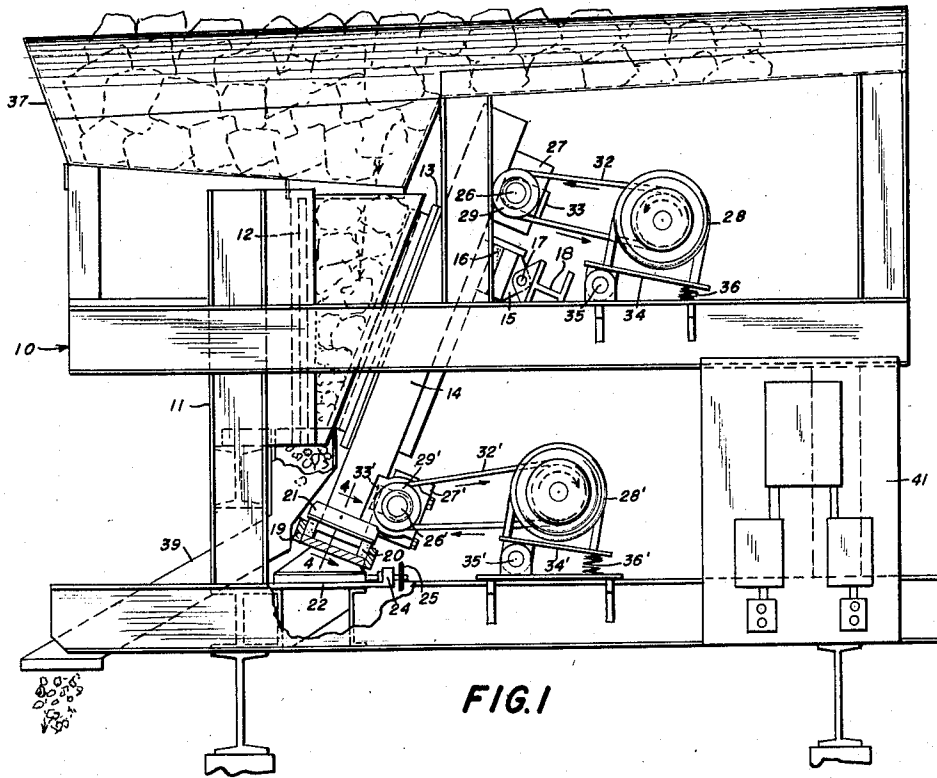


FIG. 1

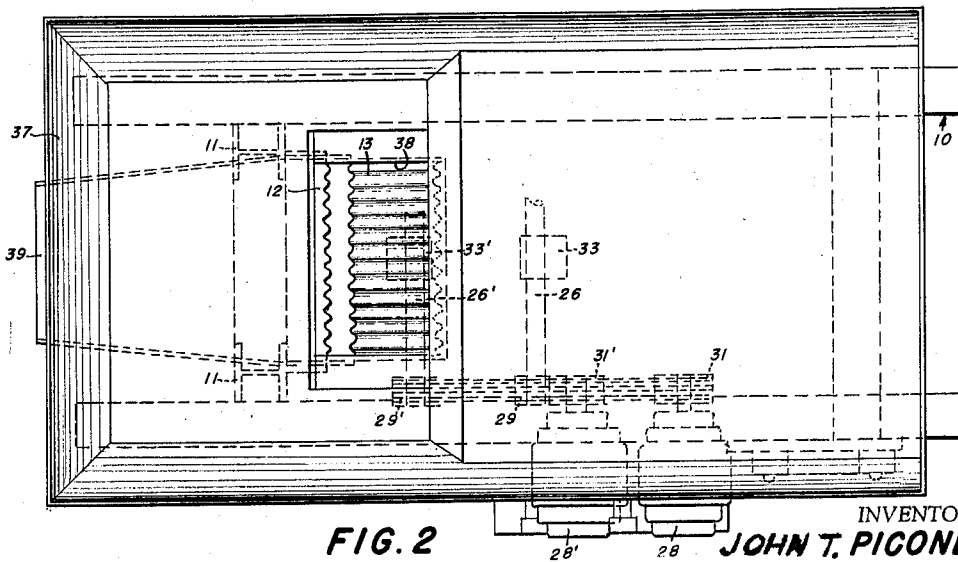


FIG. 2

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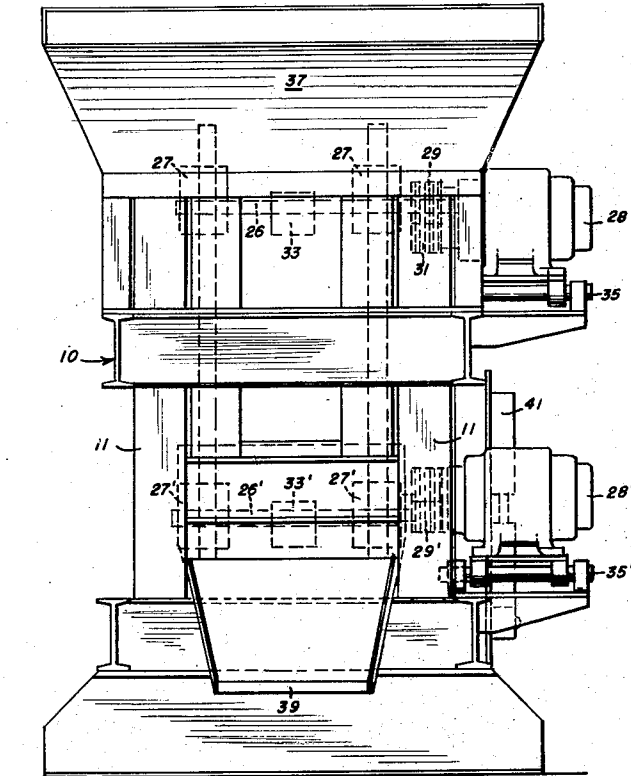


FIG. 3

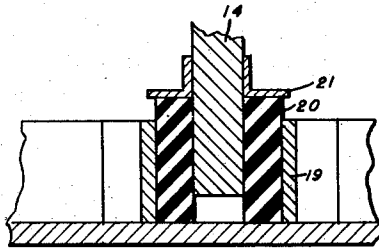


FIG. 4

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MACHINE FOR CRUSHING STONE AND THE LIKE

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2 Claims. (Cl. 241—262)

The present invention relates to a machine for crushing stone, either natural or artificial, such as cull blocks, cinder clinkers, and the like, and more particularly that type of apparatus in which a pair of opposed crushing jaws are moved relatively to each other. The crusher further comprises means for imparting a rapid vibratory motion to one of the jaws to effect the crushing operation.

In the manufacture of concrete building blocks and the like it is customary to mix with cement such material as cull blocks and cinder clinkers, but this material must first be crushed to proper size. It is an object of this invention to provide crushing apparatus which will effectively and rapidly reduce relatively large masses of aggregate to a size suitable for use in the manufacture of concrete building blocks.

It is another object of the invention to provide means for adjusting the opening between the crusher jaws to obtain crushed material of varying sizes.

A further object of the invention is the provision of novel means for mounting and vibrating one of the jaws.

Other objects of the invention will be apparent from the following description of a preferred embodiment of the apparatus when taken with the accompanying drawings in which

Fig. 1 is a side elevation, parts broken away, of the crusher;

Fig. 2 is a top plan view of the machine;

Fig. 3 is a front elevation of the apparatus; and

Fig. 4 is a fragmentary view of the means for mounting the lower end of the movable jaw.

Referring to the drawings, it will be seen that a frame 10 of structural elements forms a support for the crushing mechanism. Secured to vertical column 11 of the frame is a stationary fluted jaw 12. Opposed to jaw 12 is an inclined movable fluted jaw 13 fastened to side plates 14. The jaws are provided with faces having vertical parallel ridges separated by grooves which permit ready disposal of the finer material. The jaws converge toward the lower ends thereof. The upper end of each side plate is supported in a bracket 15, there being a cushioning member 16 of rubber or other resilient material interposed between the rear edge of each side plate and each bracket. Brackets 15 are pivotally secured at 17 to beams 18 at the rear of the movable jaw. The lower end of each of the plates 14 is resiliently mounted in a box-like support 19, there being rubber or similar resilient material 20 interposed between the sides and ends of the support and the jaw supporting plate mounted therein. Longitudinal reciprocation of the side plate is also cushioned by the member 20 against which there bears a flange 21 rigidly secured to the side plate. Thus, the movable jaw may be said to "float" in its mounting, there being no rigid or positive connection of the movable jaw to the machine frame except through the resilient cushioning members.

It will be noted that the lower supporting member 19 is slidably mounted on a base 22 rigidly connected to the machine frame and is adjustable forwardly and rear-

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wardly by means of a screw 23 connected to support 19 and threaded in nut 24 forming an integral part of the base. By turning hand wheel 25 the lower end of jaw 13 may be moved toward or away from the stationary jaw to vary the opening between the lower ends of the crusher jaws. Thus the maximum size of crushed material discharged through this opening may be effectively controlled.

The mechanism for vibrating the movable jaw will now be described. Adjacent the upper and lower ends of plates 14 and extending transversely across the width of jaw 13 are shafts 26, 26' journaled in dust proof bearings 27. These shafts are rotated at relatively high speed by motors 28, 28', there being pulleys 29, 29' on the shafts and pulleys 31, 31' on the motors, the pulleys being connected by belts 32, 32'. Fast on shafts 26, 26' are eccentric weights 33, 33'. It is obvious that as the shafts are rotated the unbalanced weights will impart a vibratory motion to the movable jaw. In practice the motors 28, 28' are rotated in opposite directions so that the vibrations at each end of the jaw are not in the same direction even though the frequency of vibration may be the same. It is also to be noted that the motors are mounted on platforms 34, 34' pivotally connected at 35, 35' to the frame forwardly of the axes of the motors so that the weight of each motor tends to exert a pull on the belts to hold them taut. To counteract the vibratory motion extending to the motors through the belts there are provided cushioning springs 36, 36' below the free ends of the motor platforms.

Mounted on top of frame 10 is a hopper 37 having a discharge opening 38 registering with the space between the upper ends of the jaws. An inclined chute 39 is positioned below the discharge or lower ends of the jaw to receive the material crushed therebetween and deposit it forwardly of the frame. A control box 41, suitably dust-proofed and containing switches for the motors, is conveniently located on one side of the frame.

In the operation of the machine the material to be crushed is fed from the hopper to the V-shaped space between the jaws. The motors rotate the unbalanced shafts on the movable jaw and the vibratory movement of this jaw is produced by a combination of the eccentric weights and the counteraction of the resilient cushions supporting the jaw in what has previously been referred to as floating relation with respect to the machine frame. This vibration of the jaw acts to reduce the dimensions of those masses of the aggregate larger than the opening between the lower ends of the jaws. When the size of the crushed material is sufficiently small to pass through this opening it falls into the underlying chute and is conveniently deposited for future use.

While a preferred embodiment of the invention has been illustrated and described, it is not intended that the exact details be adhered to except as defined in the accompanying claims. For instance, although a single eccentric weight has been shown, two or more such weights may be fastened to the rotating shafts. Also the number and position of the pulleys on the shafts may be changed as desired. Furthermore, either or both of the jaws may be vibrated. The principal function and operation of the crusher is that of rapid vibratory and relative movement of the jaws and the employment of resilient members for supporting the vibrating jaw.

The foregoing description refers to the application of the apparatus with respect to aggregate used in the manufacture of concrete blocks, but it is apparent that its use in other industries requires only such changes as may be necessitated by size and the material acted upon.

What is claimed is:

1. Crushing apparatus of the class described comprising a pair of relatively movable jaws, spaced parallel

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shafts disposed transversely of one of said jaws journaled thereon and one adjacent each of the ends of one of said jaws, a weight eccentrically secured to each of said shafts, means for rotating said shafts in opposite directions, a rigid supporting frame, pivot means connecting the upper end of said one jaw to said frame, adjustable means connecting the lower end of said movable jaw to said frame, and means for adjusting said last named connecting means toward or away from the other of said jaws.

2. Crushing means of the class described comprising a pair of relatively movable jaws, a transverse rotatable shaft journaled on and adjacent to each of the upper and lower ends of one of said jaws, a weight eccentrically secured to each of said shafts, means for rotating said shafts in opposite directions, said means comprising a motor and a belt drive for each of said shafts, a supporting platform for each motor, said platform being pivotally mounted eccentrically of the motor axis, the pivot being

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intermediate the motor and the shaft, and cushioning means for said platform.

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