Aug. 16, 1949. F. J. STRAUB 2,479,523

CRUSHER FOR CINDERS AND THE LIKE

Filed April 4, 1946 2 Sheets-Sheet 1

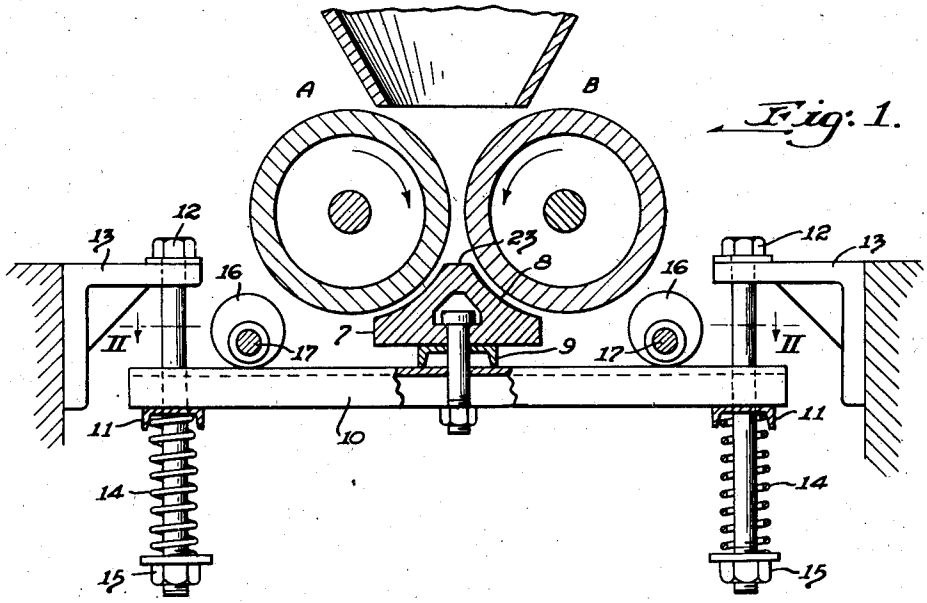

Fig. 1.

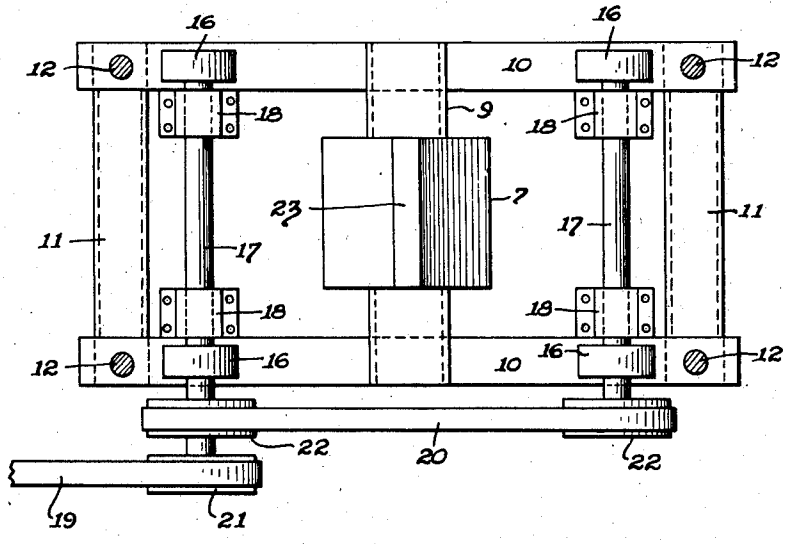

Fig. 2.

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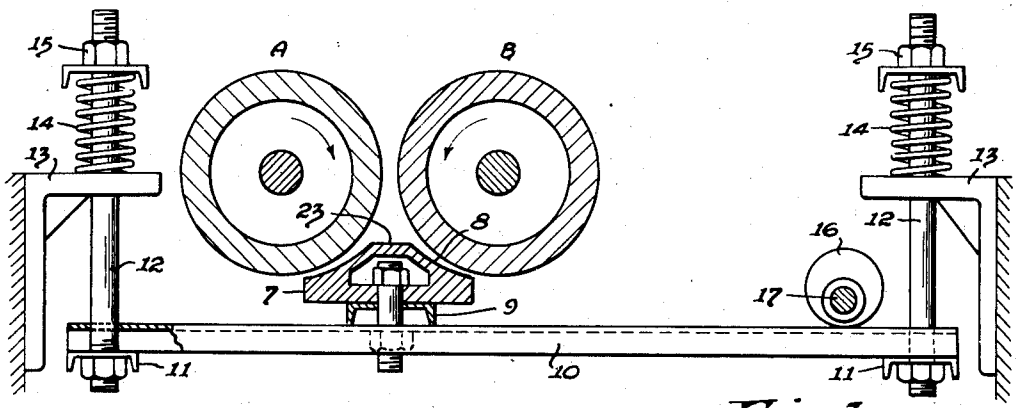

Fig. 3.

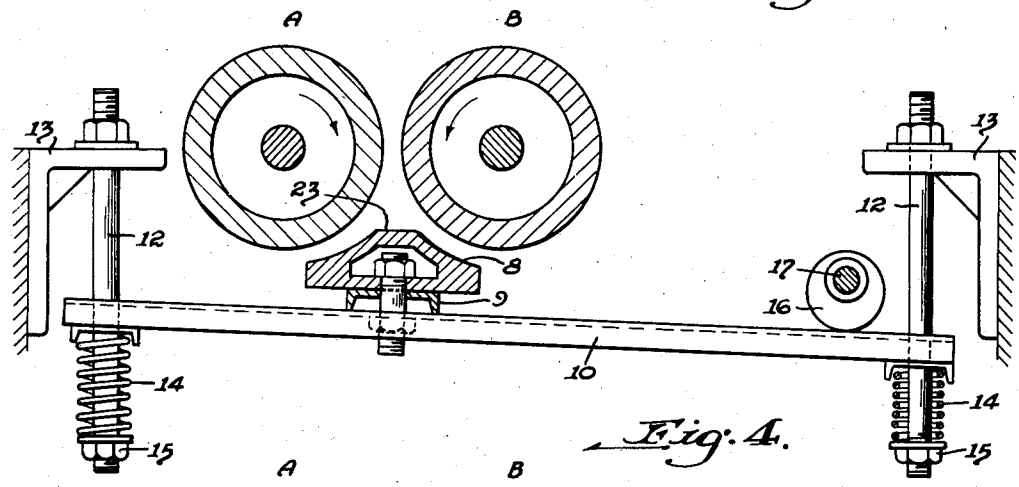

Fig. 4.

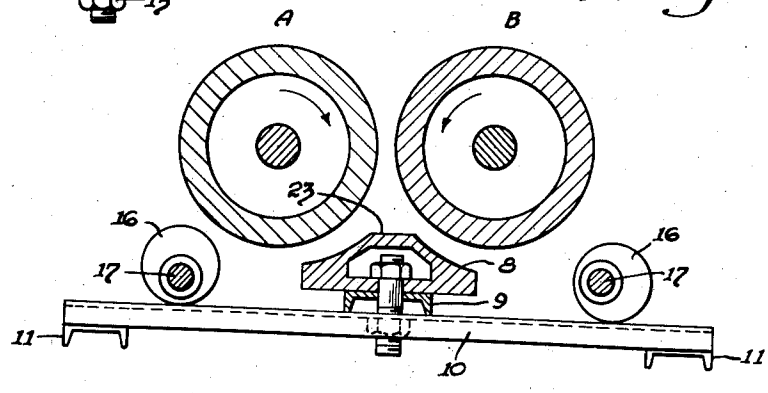

Fig. 5.

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CRUSHER FOR CINDERS AND THE LIKE

Francis J. Straub, New Kensington, Pa.

Application April 4, 1946, Serial No. 659,587

6 Claims. (Cl. 241—142)

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This invention is an improvement in crushers for reducing any suitable material, as cinders or the like, to a desired size for use in the manufacture of building blocks, or for any other purpose.

The present invention is an improvement in that class of machines disclosed in my prior patent No. 1,509,005, and has a number of useful and advantageous improvements, as the result of considerable and extended experience with similar apparatus.

One such, is in connection with the crushing of wet or damp cinders, where frequently there is a tendency for the raw material to adhere to and form a so-called carpeting on the rolls. In such cases the wet material cannot be treated properly, will not pass freely through the rolls, and frequent stoppage for cleaning is necessary.

A further obstacle is the incidental inclusion of clinkers or other hard bodies or objects in the raw material, tending to clog and interfere with its passage outwardly through and beyond the rolls. Extended experience with such machines has developed the result that if the usual intervening so-called saddle or shoe is given an independent up and down movement, the agitation of the material, together with frequent opening and closing of the clearance passages at each side, with accompanying impacts, is of considerable advantage and tends to obviate these and other difficulties.

In my improvement I provide means for imparting such positive upward and downward movement to the saddle, thus assisting the operation materially in tending to more positively and evenly crush the cinders, and especially the harder particles thereof as clinkers, and tending to produce a more satisfactory and regular output.

In the old type of machine the saddle was capable of being depressed directly against springs by the pasage of hard lumps, or of foreign substances such as metal, brick fragments etc. Such operation however resulted in excessive wear on the rolls and possible breakage, due to such unusual strains.

I have discovered also that by imparting to the saddle a continuous alternating up and down movement, and of different ways of so doing, such treatment tends to greatly assist and improve the operation and output.

In the accompanying drawings showing various means of so operating the crusher:

Fig. 1 is a sectional transverse view showing a pair of rolls and the intervening saddle, with means for so actuating the saddle.

Fig. 2 is a transverse part sectional plan view on the line II—II of Fig. 1.

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Fig. 3 is a view similar to Fig. 1 illustrating a modified construction as to the actuating mechanism.

Fig. 4 is a similar view showing the saddle in its lowermost depressed position.

Fig. 5 is a further partial similar view illustrating a modified arrangement of the actuating means, for alternating the thrust of same.

In the drawings, the rolls A and B are of the usual type used in such machines, mounted in suitable bearings, and having conventional adjusting and driving means. Below and between the rolls is the saddle 7 having the concave faces 8 as heretofore, for conforming generally to the contour of the rolls themselves, as in Fig. 1.

The saddle is secured to a suitable cross member, as a channel 9, extending midway across between the opposite side members 10, 10. The frame is also connected with cross members 11, 11, at opposite ends, or the frame may be otherwise suitably designed to provide a suitable support for the saddle and other connected elements.

It is designed that the machine as thus or otherwise made, shall be supported, as by depending bolts 12, carried by suitable brackets 13 with ample foundation supports, whereby the weight of the frame is resiliently carried in normal position. As shown, the frame is mounted resiliently by spiral springs 14 around the bolts, capable of having their tension variably adjusted, as by nuts 15.

Suitable means are provided for alternately depressing the main frame 9—10—11 against the opposing resiliency of the springs, for which purpose I utilize eccentrics or cams 16. These are carried by shafts 17 in suitable bearings 18 on the frame, and driven by any usual means, as driving belts 19—20 and pulleys 21 and 22. It will be understood also that a single eccentric may be used, positioned midway of the frame properly designed to provide for such location, or for two such eccentrics.

While the saddle 7 may be varied in construction, it is preferable to terminate the concave faces 8 as shown, so as to provide a flat terminal top 23. Such flat surface assists in the way of a primary interference of the material and its partial accumulation, tending to more equally distribute the raw material to each side.

As thus constructed, as in Figs. 1 and 2, the eccentrics working together, effect an alternating downward motion of the frame and saddle, with spring action return of the frame and saddle, at any desired speed, depending upon the control of the driving means.

In such operation the intervening spaces between the rolls and the saddle surfaces are alternately widened and narrowed, together with a forcible abrupt upward return movement. Such action tends to more successfully crush hardened pieces of clinker, slag, etc., while at the same time assisting in maintaining the surfaces of the rolls clean and active.

Another advantage also may be secured by varying the application of the downward pressure, as illustrated in Fig. 3.

In such arrangement the eccentric or eccentrics are located at one side only of the roll and saddle assembly, and if desired, with somewhat different spring cushion supports as shown. Incidentally, it is desirable to vary the strength of the spring or springs at opposite ends of the machine, and to utilize a weaker resistance at one side of the rolls when the opposite end portion only of the frame is actuated downwardly, with spring return, as in Fig. 3. It is also of advantage to locate the eccentric or other cam control at an extended distance beyond the rolls, whereby to maintain the separation movement within desired limits in assisting the operation.

An additional incident to such arrangement is that, as shown in Fig. 4, when one end only of the frame is lowered, there is a slight variation in the concave surfaces of the saddle with relation to each roll respectively, tending to slightly widen the space at one side more than at the other.

It will be observed also, that the saddle 7 of Figs. 3 and 4 utilizes concave curvatures of larger radius than that of the radius of the rolls, such curvatures being drawn from centers offset from the roll centers, resulting in a wider entrance space when the saddle is erected, tapering toward the outlet at opposite edges of the saddle.

In such construction and arrangement, with the more or less rapid and constant vertical movement of the saddle, the circulation spaces are alternately widened and narrowed, together with the accompanying somewhat severe upward thrust. Such action assists in crushing and disintegration of the raw material.

A further modification of the invention is illustrated in Fig. 5, where the eccentrics, as shown, may be so mounted on their drive shafts, as at say 90° difference in annular location, more or less, as desired.

In such arrangement, the main frame is thus subjected to an alternating see-saw motion, giving a corresponding alternating actuation to the saddle, tending to assist in regular and effective crushing of the cinders at both sides equally.

It will be understood that the contour of the saddle may be varied as to its faces with relation to those of the rolls, or otherwise, depending upon the character of the material or other controlling incidents of the treatment of the raw material being crushed.

I claim:

1. A crusher as described comprising a pair of rolls and an intervening saddle, and means for imparting constant and regular movement to the saddle towards and from the rolls consisting of fixed supporting brackets, a lower supporting frame for the saddle, vertically depending bolts extending through the brackets, cushioning springs around the bolts, and means for depressing the frame in opposition to lifting action of the springs.

2. In combination with a pair of rolls, a cooperating saddle, a supporting frame therefor, means for resiliently supporting the frame, positively driven eccentric means for lowering the frame and saddle with alternating reverse action of same, and supporting means for the frame consisting of upper supporting brackets, frame supporting bolts extending through the brackets and frame, and cushioning springs around the bolts tending to urge the frame upwardly in opposition to lowering action of the eccentric means.

3. In combination with a pair of rolls, a cooperating saddle, a supporting frame therefor, resilient means supporting the frame and saddle in uppermost position, and resisting and lowering means consisting of a constantly driven eccentric engaging the saddle support and acting in opposition to such resilient means, said resilient means comprising a series of upper brackets and supporting bolts extending through said brackets and the frame and having surrounding springs exerting constant upward pressure on the frame.

4. In a crushing machine for cinders and the like, a pair of spaced apart rolls, a lower supporting frame, means for resiliently supporting the frame, means for depressing the frame in opposition to its resilient support in alternating downward and upward movements, a saddle on the frame midway between the rolls and below the crushing space thereof, such saddle having a middle flat surface between oppositely concaved faces adapted to assume varying upwardly and downwardly alternating positions with relation to the roll surfaces as the frame and saddle are actuated by the depressing means and opposing resilient means.

5. In a crushing machine for cinders and the like, a pair of spaced apart rolls, a lower supporting frame, means for resiliently supporting the frame, means for depressing the frame in opposition to its resilient support in alternating downward and upward movements, a saddle on the frame midway between the rolls and below the crushing space thereof, such saddle having a middle flat surface between oppositely concaved faces adapted to assume varying upwardly and downwardly alternating positions with relation to the roll surfaces as the frame and saddle are actuated by the depressing means and opposing resilient means, the oppositely concaved faces of the saddle being non-concentric with relation to the curvature of the rolls.

6. In a crushing machine for cinders and the like, a pair of spaced apart rolls, a lower supporting frame, means for resiliently supporting the frame, means for depressing the frame in opposition to its resilient support in alternating downward and upward movements, a saddle on the frame midway between the rolls and below the crushing space thereof, such saddle having a middle flat surface between oppositely concaved faces adapted to assume varying upwardly and downwardly alternating positions with relation to the roll surfaces as the frame and saddle are actuated by the depressing means and opposing resilient means, the oppositely concaved faces of the saddle being non-concentric with relation to the curvature of the rolls whereby to provide gradually narrowing outlet spaces for crushed product between the rolls and the concaved faces of the saddle at varying alternating positions of the saddle.

FRANCIS J. STRAUB.

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