May 13, 1924. 1,494,036

F. J. STRAUB

CRUSHER

Filed Sept. 8, 1921

Fig. 1

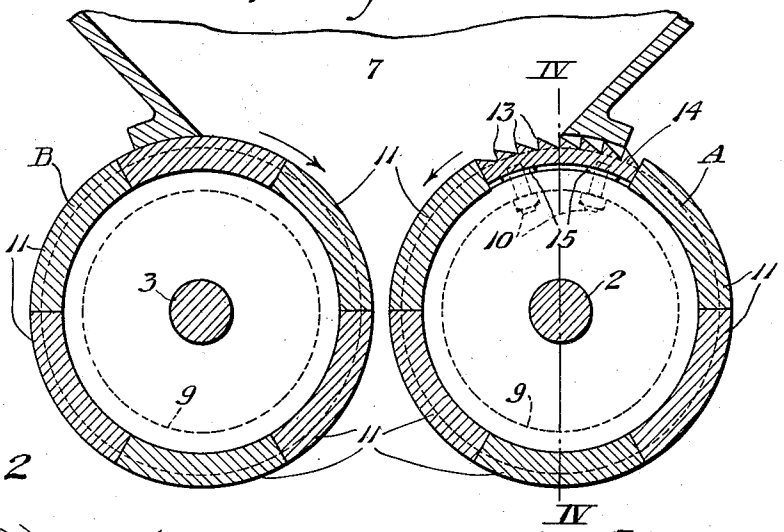


Fig. 2

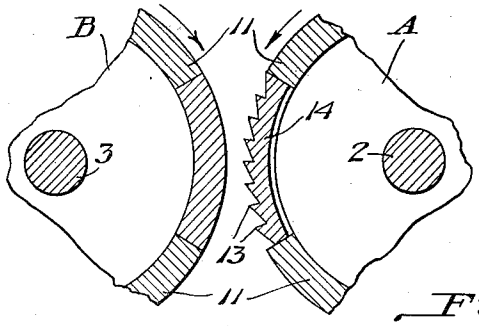


Fig. 3

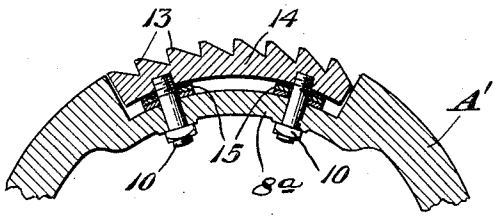
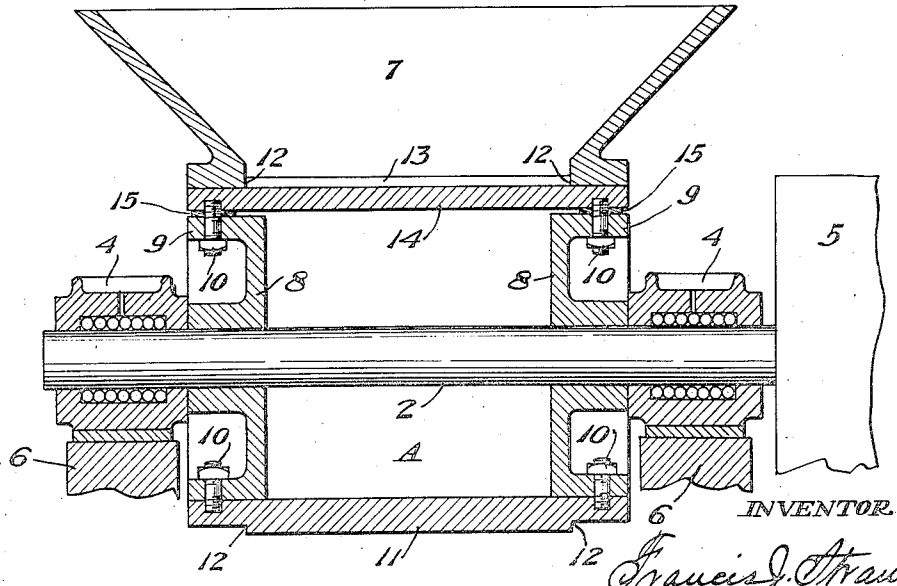


Fig. 4



INVENTOR.

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by C. M. Clarke

Atty.

Patented May 13, 1924. 1,494,036

UNITED STATES PATENT OFFICE.

FRANCIS J. STRAUB, OF NEW KENSINGTON, PENNSYLVANIA, ASSIGNOR TO CROZIER-STRAUB, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CRUSHER.

Application filed September 8, 1921. Serial No. 499,215.

To all whom it may concern:

Be it known that I, FRANCIS J. STRAUB, a citizen of the United States, residing at New Kensington, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Crushers, of which the following is a specification.

My invention consists of an improvement in crushers for reducing any material, as cinders, to a desired size for use in the arts.

The machine is particularly designed for reducing cinders and ashes containing clinkers or large pieces to a desired maximum, as say small enough to pass through a ¾ inch screen carrying with it the smaller particles, for use in making cinder blocks like those of my prior Patent No. 1,212,840 of January 16, 1917.

The machine consists of two main rolls, the crushing faces of which are provided by a series of segmental sections, one of the rolls being smooth as to all of the segments, the other having one or more toothed segments, and operating preferably at different speeds and in the manner more fully hereinafter set forth.

The present invention is an improvement in machines of the type illustrated in my pending application filed January 10, 1921, No. 436,159. The object in view is to provide for accurate adjustment for taking up wear of the toothed section of the roll so as to utilize such section continuously or until it is entirely worn out, and also to adjust the toothed section at all times to the contour of the smooth sections.

In the drawings, showing the invention as used,

Fig. 1 is a longitudinal vertical section through a portion of a crushing machine showing the rolls and feeding hopper;

Fig. 2 is a partial similar view showing the toothed segment in the reversed position;

Fig. 3 is a sectional detail view showing a modified construction of mounting and securing the adjustable toothed section; and

Fig. 4 is a vertical cross section through the machine on the line IV—IV of Fig. 1.

In the drawings, A—B are the rollers, each mounted on its carrying and driving shaft 2 and 3, respectively, journalled in pillow blocks 4, one or both of which shafts may be driven in the direction indicated by the arrows by pulley 5, or other suitable gearing.

The machine is mounted on foundation timbers 6, or other suitable base, and is provided with a superimposed feeding hopper 7 for the raw material, and any suitable receiving floor or receptacle for the crushed material. In the main construction, circular end heads 8—8 are keyed or otherwise secured by their hubs to shafts 2 and 3, and have outwardly disposed annular flanges 9 for supporting and securing the several roll segments to the heads by bolts 10, which may extend or be tapped into the end portions of the segments.

The roll peripheries are composed of series of annular segments 11, say six for each roll, preferably offset or shouldered at each end, as at 12, for snug engagement with the lower edges of the hopper 7, as the rolls rotate. The faces of the segments of roll B are shown as smooth throughout, providing a continuous annular smooth surface for the roll, while one or more of the segments for roll A are toothed, as indicated at 13; the faces of the remaining segments 11 being also smooth, as in roll B.

While any suitable form of teeth 13 may be utilized, I prefer to make them with alternating radial and tangential faces, as shown, to provide for a direct shouldered engagement against the cinders during rotation, as in Fig. 1, or for modified angular action, as in Fig. 2. This result is easily effected by loosening and reversing the toothed segment, end for end, as will be readily understood. Thus, with very hard cinders, the toothed segment is set, as in Fig. 1, while with softer material, it is reversed, as in Fig. 2.

The purpose of providing the toothed segment is that while ordinarily the material is readily crushed between the smooth faces, it will sometimes clog above the bite of the rolls, and requires disturbance to break up the mass, so that it will pass through between the rolls, as by the intermittent action of the teeth from time to time throughout the revolutions of the rolls. A further advantage in providing the corrugated section is that it tends to carry through a larger proportion of cinders which is of advantage, rather than to tend to pulverize the whole mass.

It will be understood that each of shafts

2 and 3 may be driven directly from a belted pulley 5, or other suitable gearing and at the same or variable speeds. The toothed segment 14 provided with teeth of the kind shown, or other suitable form, is most subject to wear and more or less rapid abrasive action of the material being crushed, and I have therefore provided means for adjusting it outwardly to compensate for such wear and to utilize the toothed segment to the full extent of its usefulness.

A further advantage is that, as the smooth faced segments or portions of the roll wear away, the normal diameter is thereby reduced. Upon removing the toothed segment in such case, its teeth therefore would extend beyond the contour of the smooth roll faces. The present invention provides for easy and exact adjustment by proper use of liners so that the contour of the corrugations or teeth may be set backwardly, as well as outwardly, thereby meeting such conditions of wear.

As shown, segment 14 is mounted upon the flanged peripheries of heads 8 and connected thereto by the bolts 10, with intervening liners or spacing elements 15. These may be a series of thin metal or other washers, capable of being decreased or increased in number and resulting thickness, so as to quite accurately supplement the intervening space between the under side of section 14 and the varying face of flange 9, as the operation of the machine results in a wearing away of the faces of the teeth. By removing the section and adding to the spacers, the toothed face may be accurately brought to approximately the peripheral line of the roll, and such operation may be continued until the teeth are entirely worn down.

In Fig. 3 I show a modified construction and arrangement in which a support for the toothed section is made by extending the middle body portion 8^a continuously across between the heads 8, integral therewith if desired, and providing a supporting bridge for the section 14. In such case the section is connected with the intermediate portion of the bridge by the bolts 10 with the intervening washers 15, in the manner already described.

As thus constructed, the machine is well adapted to the special work of crushing cinders of variable quality, and its facility to adaptation to the different conditions arising in the work of reducing such material for the manufacture of building blocks will be appreciated by all those skilled in the art.

It is very strong and durable, not liable to get out of order, and capable of continuous operation and a large output. One especial advantage of the segmental construction of the rolls is that in case of wear or breakage, one or more of the segments can easily be replaced.

The machine may be modified or changed in different details of construction or proportions or number of the parts, or in other respects, by the skilled mechanic, but all such changes are to be considered as within the scope of the following claim.

What I claim is:

In crushing apparatus of the kind disclosed, a roll having a longitudinal segmental socket between terminals of its normal annular face, inner annular supporting portions, a segmental toothed section in said socket between said terminals, and securing bolts extending through said supporting portions and connecting the segmental section therewith, with intervening spacing liners.

In testimony whereof I hereunto affix my signature.

FRANCIS J. STRAUB.