March 16, 1926. 1,577,382

F. J. STRAUB

CRUSHER

Filed Jan. 10, 1921 2 Sheets-Sheet 1

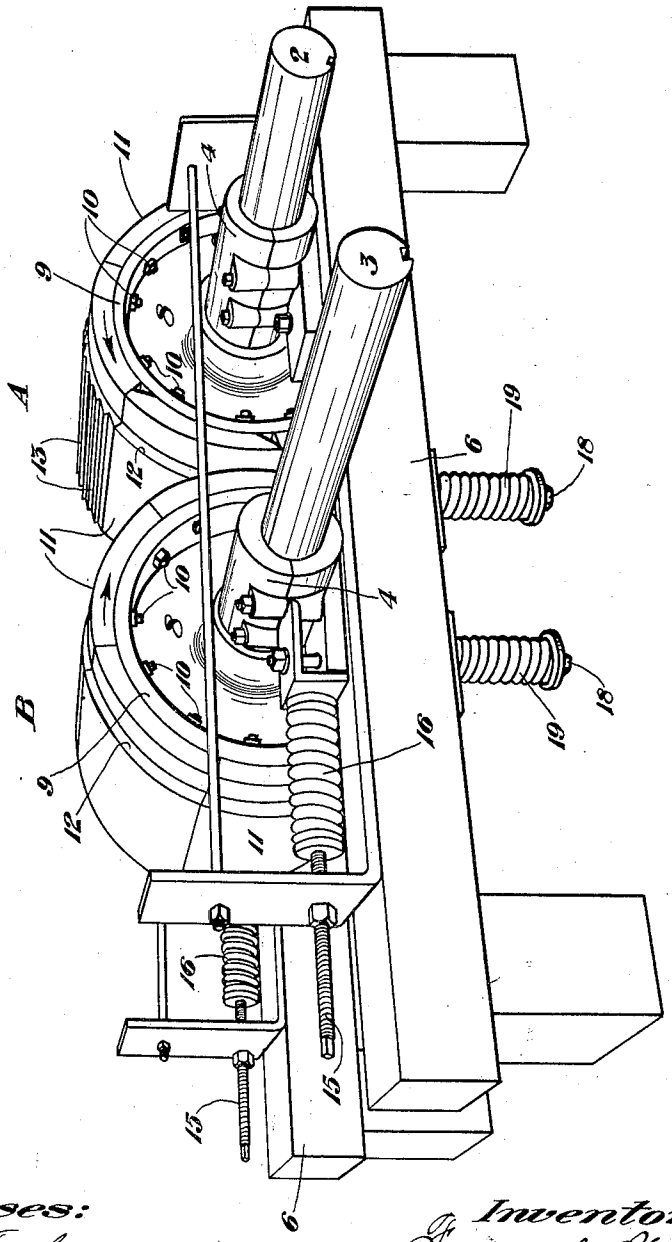


Fig. 1.

Witnesses:
Edwin Straub
Lois Whiteman

Inventor:
Francis J. Straub
by C. M. Clark
Atty.

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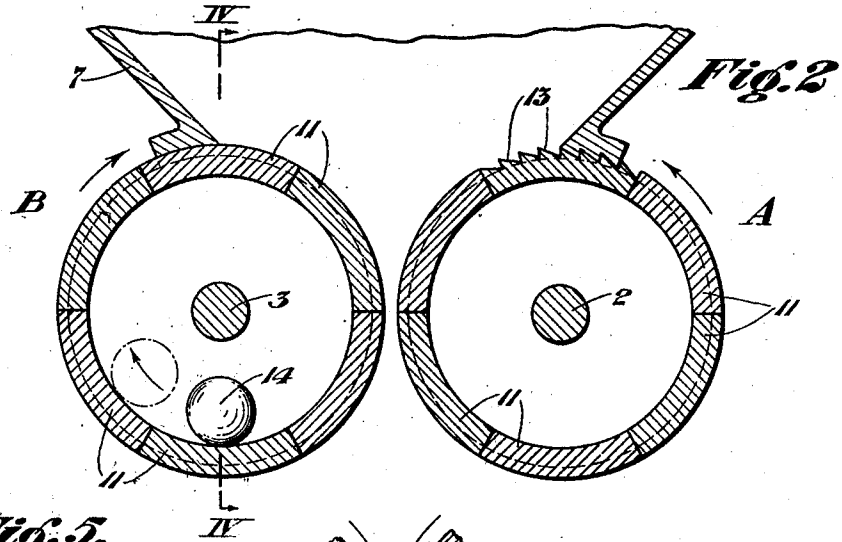


Fig. 2

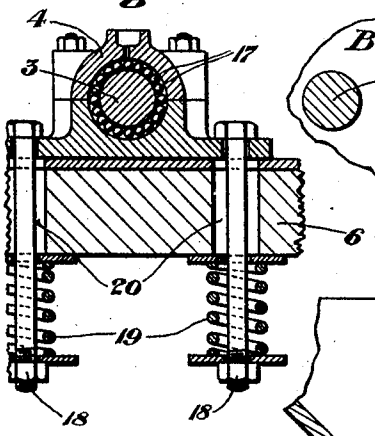


Fig. 5.

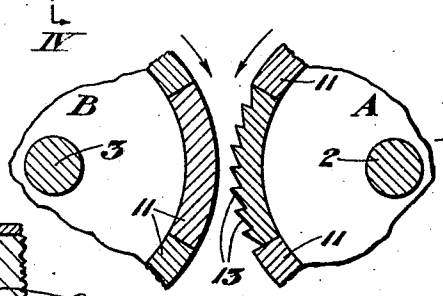


Fig. 3.

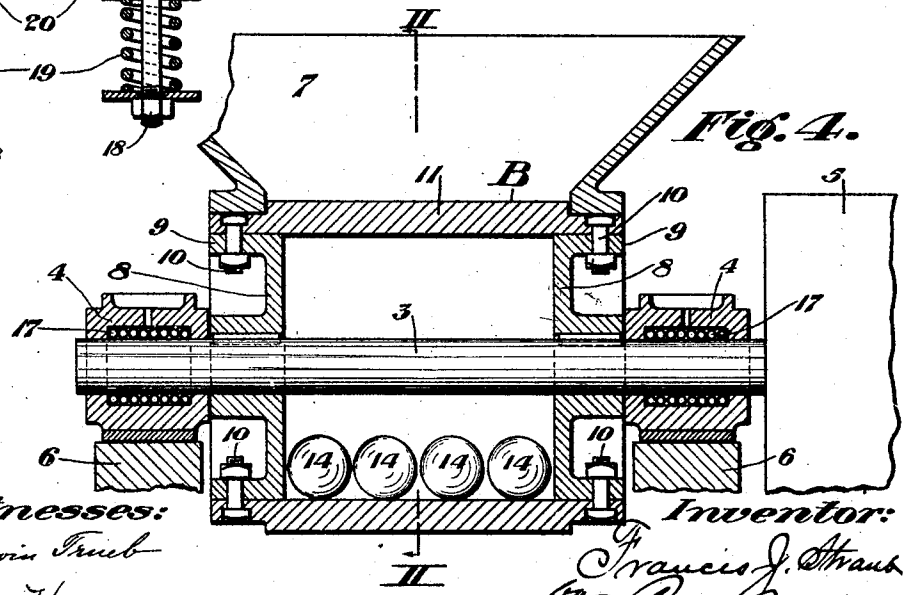


Fig. 4.

Witnesses:
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Lois Thieman

Inventor:
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Patented Mar. 16, 1926. 1,577,382

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 January 10, 1921. Serial No. 436,159.

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 Allegheny 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.

In the drawings showing one preferred embodiment of the invention,

Fig. 1 is a perspective view of the crusher rolls in position for operation, the hopper being removed;

Fig. 2 is a longitudinal vertical section therethrough, on the line II—II of Fig. 4;

Fig. 3 is a sectional detail showing the toothed segment in reversed position;

Fig. 4 is a vertical cross section on the line IV—IV of Fig. 2; and

Fig. 5 is a sectional detail view of one of the crusher roll shafts and the roller bearing therefor.

In the drawings, A, B, are the rollers, each mounted on its carrying and driving shafts 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 a pulley or pulleys 5, or other suitable gearing. The machine is mounted on timbers 6 or other suitable foundation, and is provided with a superimposed feeding hopper 7 for the raw material and any suitable receiving floor or receptacle for the crushed material. Keyed or otherwise secured by their hubs to shafts 2, 3, are the circular end heads 8, 8, having outwardly disposed annular flanges 9 for supporting and securing the several segments to the heads by bolts 10, the heads of which are preferably counter-sunk in the segment ends, as shown.

The roll peripheries are composed 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. 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 of roll A are toothed, as indicated at 13, the faces of the remaining segments 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, as in Fig. 2, or for modified angular action, as in Fig. 3. 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. 2, while with softer material, it is reversed as in Fig. 3.

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.

As stated, each of shafts 2 and 3 may be driven directly from a belted pulley 5, and at the same or variable speeds.

When thus driven, I prefer, however, to have the speed variable, as say 90 R. P. M. for roll B and 15 R. P. M. for roll A, so as to effect an approximate rubbing action of the material by one roll through the material against the other, which action, in some degree, minimizes the proportion of dust and finer particles. I have found also that very good results may be secured by driving one roll only, as roll A, motion being imparted to the other roll B through the material itself by frictional engagement. In such use of the machine, a modified pendulum or agitating action may be imparted to the roll by loading it on the inner bottom by rolling weights, as balls 14. These balls tend to climb up the advancing side of the rotating

roll, as indicated in dotted lines, Fig. 2, and to roll back and forth across its bottom with considerable violence, depending on the speed of the roll itself. They also tend to intermittently check and vary its speed, the resulting effect of which is to tend to dislodge and loosen any accumulated mass of uncrushed material, causing it to be taken hold of and crushed.

If desired, rollers may be substituted for the balls, as by using one or more sections of cylindrical shafts, or the rolling weights of whatever form may have small projections on their surfaces tending to give a slight jarring action.

The rubbing action of the rolls may be also secured in an increased degree by positively driving both rolls in the same direction, with the speed of the advancing roll materially faster than that of the receding one, and such method of operation is contemplated in certain cases as within the scope of the invention.

The machine is thus capable of adaptation to a considerable variety of cinders, as to their hardness, porosity, etc., and the segmental construction of each roll provides for easy and quick adjustment to suit the various conditions provided for.

As shown in Fig. 1, the shaft bearings for one of the rolls may be adjusted to accurately space the rolls apart by limiting bolts 15 in connection with cushion springs 16 which allow the roll to temporarily recede and prevent breakage in case of the entrance between the rolls of any foreign or extra hard material.

For the purpose of reducing friction and assisting in the easy rotation of the rollers, the pillow block 4 may be provided with roller or ball bearings 17 for shaft 2.

The pillow block itself is also secured to its foundation by bolts 18 having cushion springs 19, and the bolts extend through slotted openings 20 providing for limited movement of the bearing under tension of springs 19. By this means, there is a considerable degree of flexibility ensured so as to prevent breakage or undue strain from solid material between the rolls.

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 claims.

What I claim is:

1. A crusher including a pair of cooperating crushing elements, one of which elements may be rotated, and rolling weights within the interior of said rotatable element for varying the rotative movement of said element.

2. A crusher including a pair of cooperating crushing rolls, and rolling weights in one of said rolls for varying the rotative movement thereof.

In testimony whereof I hereunto affix my signature.

FRANCIS J. STRAUB.