May 13, 1941. W. P. TRELOAR 2,241,491

MACHINE FOR DISINTEGRATING SOLID AND SEMISOLID MATERIALS

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Fig. 1.

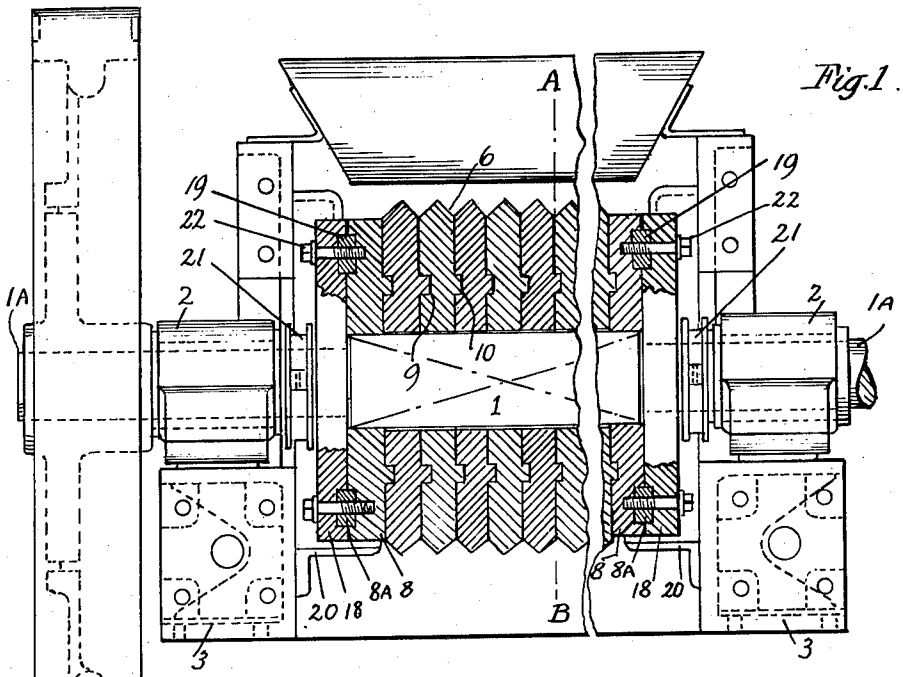
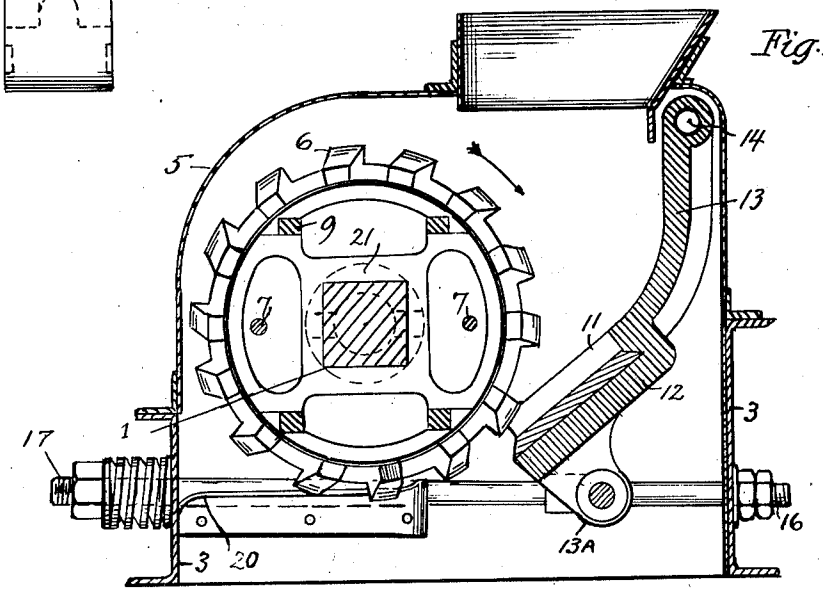


Fig. 2.



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MACHINE FOR DISINTEGRATING SOLID AND SEMISOLID MATERIALS

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4 Claims. (Cl. 83—12)

This invention relates to improvements in machines for disintegrating solid or semi-solid materials, more particularly for disintegrating minerals, ores, coke, ceramic compounds, glass and the like, its object being to provide improved means for easily withdrawing or removing the rotary disintegrating members or cutting disks without disturbing or dismantling the rest of the stationary or driving parts of the machine for the speedy removal and/or replacement of worn-out or broken disks, or for the exchange of the set of rotary disintegrating members in use by another set of disintegrating members of different width and/or pitch, in order to enable the same machine to be used for disintegrating solid or semi-solid materials of different origins or various hardnesses, volume or bulk.

According to this invention the rotary disintegrating elements in the form of rollers are built up of a plurality of toothed disks, loosely arranged on a removable square shaft, but rigidly held together by means of end disks detachably secured on said square shaft. The rollers built up in this manner are connected to the driving shafts proper by means of outer fixed disks similar to the end disks, the outer disks being secured to the end disks by bolts and coupling members in said disks.

The toothed and the end disks are provided with means to ensure their exact and lasting alignment and registering in axial direction as well as in their relation to the serrations of the stationary disintegrating members employed in combination with said toothed disks, in such a manner that the highest points on the circumference of the teeth are caused to be exactly in the middle between the highest points of the serrations on the stationary disintegrating members.

In order to ensure a splitting of the material to be disintegrated, instead of being crushed, or to ensure its compacting it is important that the axial centres of the shaft of the rotary disintegrating element and of the fulcrum of the arm of the stationary but adjustable member are correctly arranged.

The means for ensuring the exact alignment and registering of the teeth of the rotary disintegrating elements with the serrations of the stationary elements consists of a plurality of projections on one side of the individual disks and corresponding recesses on the other side of said disks, both adapted to fit one into another, thus serving as keys or couplings for transmitting the rotation of the driving shaft via the end-disks to the toothed disintegrating elements.

In order that the invention may be clearly understood and readily carried into effect the same will now be described more fully, by way of example, with reference to the accompanying drawing, in which:

Figure 1 is a front elevation of the machine, showing partly in section the toothed disks, Figure 2 is a vertical section on the line A—B of Figure 1.

The driving shafts 1A are journalled in the bearings 2 which are mounted on the frame 3 of the machine. The rotary disintegrating element in the form of a roller 15 built up of a plurality of toothed disks 6 loosely arranged on a square shaft 1, but rigidly held together by means of end disks 8 detachably secured on the square shaft 1. The roller built up in this manner is connected to the driving shafts 1A by disks 18, welded on the ends of the shafts 1A, and secured together in axial direction by bolts 22 and coupling members 19 in said disks. Thus the shafts 1 and 1A, although consisting of three individual parts, form one unit, for transferring the rotation of shafts 1A to the disks 6 by means of projections 9 on one side of said disks fitting in corresponding recesses 10 in the adjacent disks, at the same time serving also for ensuring the exact alignment and registering of the teeth of the rotary disintegrating members 6 with the serrations 11 of the stationary elements 12.

The stationary elements 12 are secured to arms 13 fulcrumed on a shaft 14 which is journalled in the frame 3.

The arms 13 are provided with means for adjusting the distance between the serrations 11 and the circumference of the disks 6 in order to regulate the size of disintegration of the materials or of the volume of compacting, and for this purpose lugs 13a, Figure 2, are provided at the lower ends of the arms 13 which are connected to the spring loaded adjusting rods 16 serving in known manner as a safety device against breakage in the event of too large materials entering between the members 6 and 11.

The means for ensuring the exact alignment and registering of the teeth of the rotary disintegrating elements with the serrations of the stationary elements consists of a plurality of rectangular projections 9 on one side of the individual disks 6 and corresponding recesses 10 on the other side of said disks, both adapted to fit one into another, and can be made integral with the individual disks by casting or forging.

The shafts 1 and 1A, connected in aforesaid manner, are held in the exact middle position between the bearings 2 by means of the split-rings 21, of standard construction.

To easily and speedily withdraw the rotary disintegrating roller, it is only necessary to remove the two split-rings 21, unscrew the bolts 22 from the end disks 8 and loosen the driving disks 18 by means of the insertion of chisels or the like, into the slots 8a provided on the periphery of the disks 8 and 18.

The roller—thus freed—can now be lowered on to the rail-members 20 and rolled out of the machine on the end disks 8, for repairs or exchange by spare rollers, which later are replaced into the machine by reversing the aforesaid dismantling procedure.

It will be obvious that the aforesaid elements and members forming the features of this invention can be assembled and housed in any suitable and appropriate framework or casing and that they can be made in any desired shape and size other than described above and for various purposes according to the present invention without departing from the nature of the invention.

I claim:

1. In a machine for crushing and disintegrating solids, of the character described, the combination with a supporting frame, comprising bearings at the opposite sides thereof, of a pair of spaced aligned stub driving shafts respectively mounted in said bearings, a fixed disk upon the inner end of each of said shafts, a unit comprising a central shaft, angular in cross section and of a length to fit between said disks of the stub shafts and to lie in axial alignment with the said stub shafts, a group of disintegrating disks mounted in assembled relation upon said central shaft section and having openings through them conforming in shape to the shape of the central shaft section to thereby be caused to rotate with said shaft section, end disks fixed upon the central shaft section to turn therewith, and removable fastenings traversing the said end disks and the fixed disks of the stub shafts by means of which fastenings the unit consisting of the disintegrating disks, the central shaft section and the end disks is supported and caused to rotate with the stub shafts, removal of said fastenings permitting said unit to pass laterally from between the fixed disks of the stub shaft with the disintegrating disks still held in assembled relation upon the central shaft section.

2. A structure as recited in claim 1 in which interengaging recesses and projections are provided upon the confronting faces of the disintegrating disks.

3. A structure as recited in claim 1 in combination with rail members mounted upon the frame in a position to underlie the end disks of the unit so that the unit still in assembled condition may be rolled upon the end disks out of the frame and upon said rails.

4. In a machine for crushing and disintegrating solids, of the character described, the combination with a supporting frame, comprising bearings at the opposite sides thereof, of a pair of spaced aligned stub driving shafts respectively mounted in said bearings, a fixed disk upon the inner end of each of said shafts, a unit comprising a central shaft angular in cross section and of a length to fit between said disks of the stub shafts and to lie in axial alignment with the said stub shafts, a group of disintegrating disks mounted in assembled relation upon said central shaft section and having openings through them conforming in shape to the shape of the central shaft section to thereby be caused to rotate with said shaft section, end disks fixed upon the central shaft section to turn therewith, removable fastenings traversing the said end disks and the fixed disks of the stub shafts by means of which fastenings the unit consisting of the disintegrating disks, the central shaft section and the end disks is supported and caused to rotate with the stub shafts, removal of said fastenings permitting said unit to pass laterally from between the fixed disks of the stub shaft with the disintegrating disks still held in assembled relation upon the central shaft section, and split rings encircling the stub shafts and lying between the adjacent bearings and the fixed disks of the stub shafts.

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