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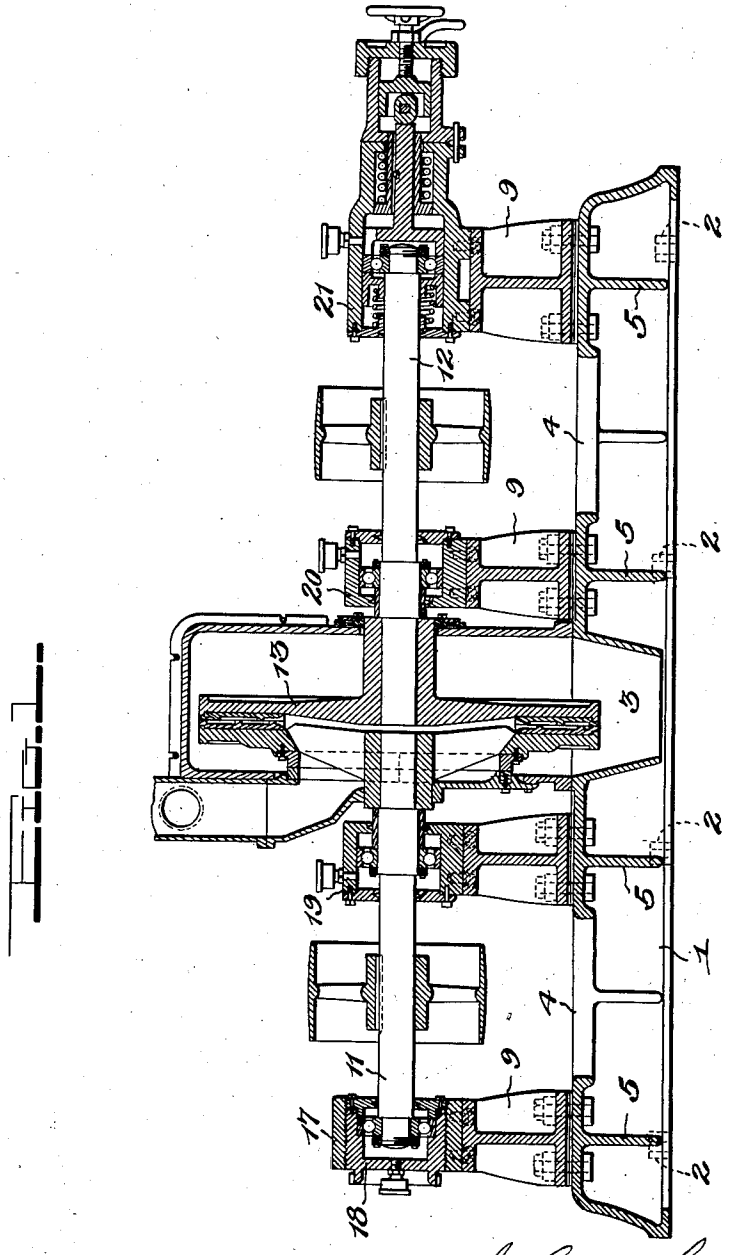
ATTRITION MILL.

APPLICATION FILED JULY 1, 1914.

1,111,274.

Patented Sept. 22, 1914.

2 SHEETS—SHEET 1.



Witnesses

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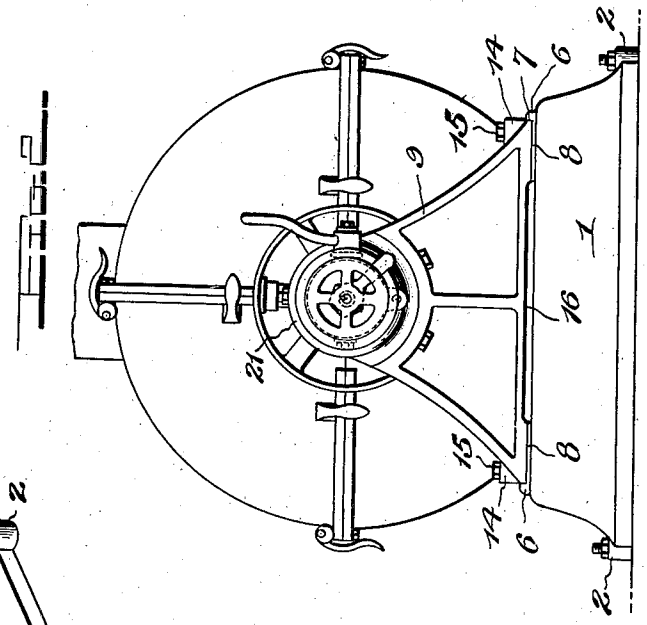
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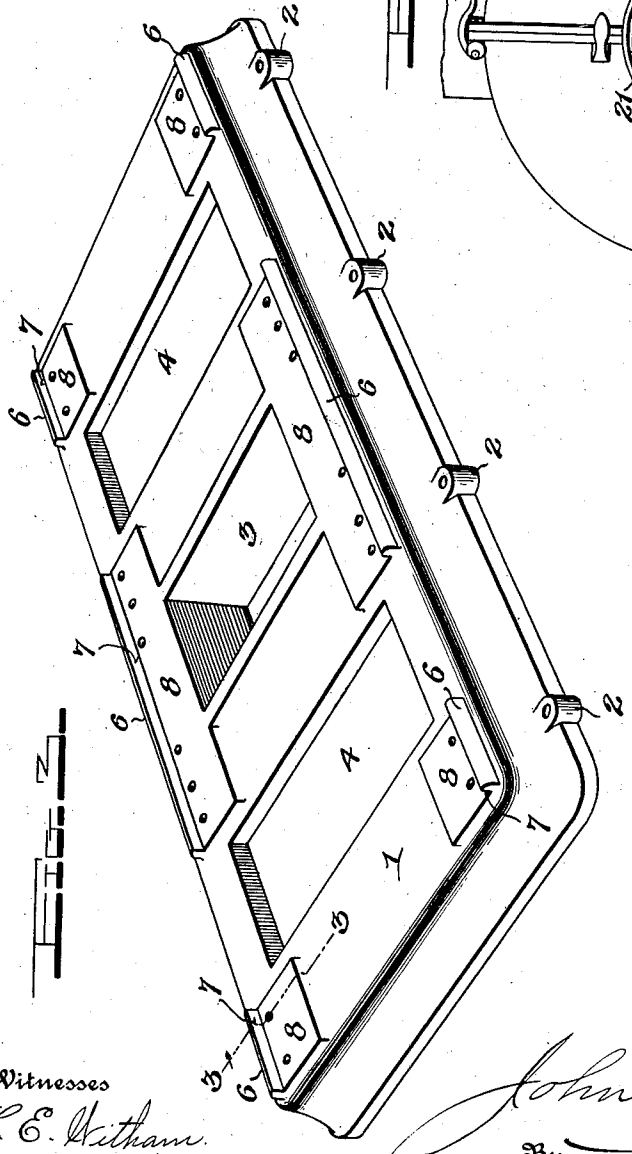
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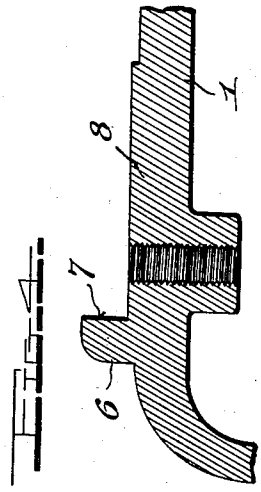
1,111,274.

Patented Sept. 22, 1914.

2 SHEETS—SHEET 2.







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UNITED STATES PATENT OFFICE.

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ATTRITION-MILL.

1,111,274. Specification of Letters Patent. Patented Sept. 22, 1914.

Original application filed April 7, 1911, Serial No. 619,621. Divided and this application filed July 1, 1914. Serial No. 848,344.

To all whom it may concern:

Be it known that I, JOHN S. SORENSEN, a citizen of the United States, residing at Muncy, in the county of Lycoming and State of Pennsylvania, have invented certain new and useful Improvements in Attrition-Mills; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to attrition mills; this application being a division of my application, filed April 7, 1911, Serial No. 619,621.

The objects of the present invention are to provide simple, inexpensive and efficient means whereby the runner-shafts will be supported positively and fixedly in axial alinement and the runners maintained with their working faces or grinding plates in parallel relation so as to avoid the necessity for tramming, which is necessary in attrition mills as heretofore constructed; the only adjustment required after the mill has been set up in operative position being a longitudinal movement of the runner-shafts to take up or compensate for wear upon the grinding plates and the sealing rings.

In the accompanying drawings, Figure 1 represents a vertical longitudinal sectional view of an attrition mill embodying my invention; Fig. 2 is an end elevation; Fig. 3 is a perspective view of the base; and Fig. 4 is a detail sectional view taken on the line 3—3 of Fig. 3.

Referring to said drawings, in which the same reference characters or numbers are used to denote corresponding parts in different views, 1 denotes the base, which may be of any desired size. It is preferably in the form of a parallelogram, and provided along its longitudinal side edges with sockets or brackets 2, through which fastening bolts may be inserted for securing it to a suitable foundation or fixed support, and has a centrally disposed spout 3, through which the ground material escapes to be stored or subsequently treated as may be necessary or desirable, according to the nature of the product. Between each end of the base and the spout 3 an opening 4 may be provided through its top to reduce its weight without affecting its strength, and ribs 5 may be formed on its under side at opposite sides of said openings 4, to reinforce and strengthen the top plate and also lend additional support to the devices secured thereon. In order that the runner-shafts may be maintained in axial alinement and the grinding surface of the runners kept in parallel relation without tramming, the base is formed or provided on its upper side with longitudinal ribs or abutments 6, the inner faces or shoulders 7 of which may rise from the base or bosses thereon in true vertical planes. The several ribs at each side are arranged in exact longitudinal alinement, and each rib or abutment preferably rises from a boss 8 on the top of the base, which boss has a perfectly smooth upper face or surface arranged in a true horizontal plane, whereby a series of alined seats are provided for runner-shaft supports, said seats having alined marginal ribs or abutments between which said supports are confined. Mounted on said seats between and closely engaging said abutments are runner-shaft supports or pedestals 9. The runner shafts 11 and 12 are each journaled in a plurality of said supports and each shaft carries a runner 13 having its grinding surface arranged to coact with the grinding surface of the adjacent runner. Through the bosses 8 and the base are vertically disposed internally threaded openings adapted to receive tap bolts inserted through the lower ends of the pedestals or runner-shaft supports to secure the same in position. In the form shown the pedestals have their lower corners planed so as to present angular surfaces which are adapted to fit snugly upon the upper faces of the bosses 8 and against the inner faces of the ribs or abutments 6. A number of these pedestals are provided, two being shown to support each runner-shaft, and the several pedestals may be identical in construction, except that the tail end pedestal is preferably somewhat wider than the others, in order to afford the necessary support for an end thrust bearing. Upon the sides of the pedestals, at the lower ends thereof, are preferably formed upstanding

bosses 14 through which the tap screws 15 are inserted to engage the openings in the base and thereby firmly secure the pedestals in position.

In the illustrated embodiment of my invention, the outer face or side of the lower corner of the pedestal is disposed at a true right angle to the under face of the same and in a true vertical plane, in order that the several pedestals may be fitted upon the bosses of the base and between the ribs thereon with such nicety and accuracy that subsequent adjustment of the same will be rendered entirely unnecessary. The fastening screws may therefore be turned home, so as to rigidly secure the pedestals in position without the use of any lock-nuts, and when the pedestals are once secured in place, they will remain fixed during the life of the machine. The bosses upon the base provide seats raised slightly above the plane of the top of the base while the under sides or lower ends of the pedestals are recessed between their extremities, as shown at 16, so that the contacting surfaces will be reduced to the smallest possible area and possible wear due to any unforeseen vibration of the machine will be obviated.

The upper ends of the pedestals are adapted to receive and support bearings for the runner-shaft supports. As shown, a bearing shell of substantially the form of a sleeve is provided, the length of which may correspond to the width of the seat therefor on the upper end of the pedestal, and the shells are secured in place so that movement thereof upon the pedestals will be prevented and consequently the necessity for adjustment of the bearings will be overcome. As the bearing shells cannot move relatively to the pedestals and the pedestals cannot move relatively to the base, wear upon these parts is prevented and when once assembled they will remain fixed in place for all time. The bearing shell for the end bearing 17 is interiorly threaded throughout its length, and is open at both ends, and has a box 18 screwed therein within which is secured an anti-friction bearing in which the end of the head runner shaft 11 is mounted, while the bearing shells for the intermediate bearings on opposite sides of the housing for the grinding heads have smooth bores in which are slidably fitted anti-friction bearings for the runner-shafts. The inner bearing 19 for the head runner-shaft 11 is a duplicate of the inner bearing 20 for the tail runner-shaft 12, except that the cover is at the opposite side of the center of the mill. Said shells 19 and 20 have their inner ends adjacent the casing for the runner heads partly closed by internal ribs or flanges. The outer end of the runner-shaft 12 is mounted in an anti-friction bearing slidably fitted in a bearing shell 21 which is provided with a reduced cylindrical extension or neck inclosing a spring and associated parts arranged to urge the shaft inwardly while a weaker spring interposed between a cover plate on the inner end of the shell and a sleeve on the shaft tends to move the shaft outwardly, or in a direction to separate the runner-heads; but inasmuch as these parts including the quick release devices associated therewith, are not claimed herein, further description thereof is deemed unnecessary.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination, in an attrition mill, of a base having a series of alined seats at each side thereof for runner-shaft-supports, said seats having alined marginal ribs or abutments for confining such supports therebetween, a plurality of runner-shaft-supports mounted on said seats between and closely engaging said abutments, and runner-shafts each journaled in a plurality of said supports and each carrying a runner having its grinding surface arranged to coact with the grinding surface of the adjacent runner in grinding, whereby said shafts are maintained in axial alinement and the grinding surfaces of said runners kept in parallel relation without tramming.

2. A non-trammable attrition mill comprising a base having a series of alined seats thereon for runner-shaft supports, a series of supports fitting in said seats, alined shafts journaled in bearings on said supports each carrying a runner at one end arranged in cooperative relation to a runner on the adjacent end of the other shaft, and means for securing said supports fixedly in their seats with provision for longitudinal adjustment thereof, whereby said shafts are positively and fixedly maintained in axial alinement and the grinding surfaces of said runners kept in parallel relation without tramming.

3. A base for attrition mills provided at each side thereof with a series of alined bosses on its top adapted to support in axial alinement a plurality of runner-shaft-supports and upstanding shoulders at the outer edges of said bosses arranged in alinement, said bosses and shoulders constituting angular seats for runner-shaft-supports which permit longitudinal movement of the supports when engaged therewith.

4. A base for attrition mills having longitudinal series of bosses on its top and shoulders at the outer edges of said bosses, the tops of the bosses being smooth and all in the same horizontal plane and the shoulders at each side of the base being arranged in alinement, whereby the bosses and shoulders constitute alined angular seats for runner-shaft supports which permit longitudinal movement of the supports when engaged therewith.

5. A base for attrition mills having a central depending discharge spout and depending transverse ribs on its under side between said mouth and its ends, and provided on its upper side with bosses over said ribs and abutments at the outer edges of said bosses, said bosses and abutments constituting alined angular seats for the runner-shaft supports.

6. In an attrition mill, the combination of a base having at each side thereof a series of alined angular seats on its upper side extending longitudinally of the base for their full length, rigid pedestals having angular lower corners fitting closely in said seats and secured to the base, and runner-carrying shafts each supported on a plurality of pedestals and carrying a runner the grinding surface of which is parallel with and arranged in operative relation to the grinding surface of the runner on the other shaft and maintained in such relation without tramming.

7. A non-trammable attrition mill comprising a base having a series of alined seats and oppositely disposed abutments thereon, a series of a lined runner-shaft supports seated between and engaging said abutments, alined runner-shafts journaled in bearings on said supports, there being a plurality of said supports for each shaft, and each shaft carrying a runner having its grinding surface arranged in coöperative relation to the grinding surface of the runner on the other shaft, whereby said shafts are positioned and maintained in alinement rendering tramming unnecessary.

8. In an attrition mill, the combination with a base having parallel pairs of facing abutments extending longitudinally of the base for their full length, of rigid runner-shaft supports fitted between said respective pairs of abutments, and runner shafts journaled in said supports whereby said shafts are positively retained in alinement with one another and the necessity for tramming is avoided.

9. A base for attrition mills having oppositely disposed series of alined seats for runner-shaft supports and a series of alined abutments at the outer edges of said seats for engaging said supports and retaining them positively in alinement with one another, whereby the necessity for tramming is avoided; said abutments extending longitudinally of the base for their full extent, whereby the supports may be moved longitudinally on the base while in engagement with the abutments.

10. A non-trammable attrition mill comprising a supporting base having a series of alined seats thereon extending longitudinally thereof, rigid pedestals detachably secured to said base, and having angular lower corners fitting closely against alined shoulders extending along the outer margins of said seats, shaft bearings on said pedestals, there being a pair of bearings for each shaft, and a shaft revolubly fitted in each pair of bearings.

11. A non-trammable attrition mill comprising a base having at each side thereof a series of alined seats thereon, a series of alined pedestals fitting in said seats and secured to said base, and runner-carrying shafts each revolubly supported in bearings on a plurality of said pedestals and carrying at one end a runner having its grinding surface arranged parallel with and in coöperative relation to the grinding surface of the runner on the adjacent end of the other shaft.

12. A non-trammable attrition mill comprising a supporting base having a series of alined angular seats on its upper side extending longitudinally thereof, pedestals having angular bases fitting between and closely against oppositely disposed seats, means for securing said pedestals in fixed positions, and two shafts each revolubly supported in bearings on a plurality of said pedestals, and a runner on the end of each of said shafts having its grinding surface arranged parallel with and in operative relation to the grinding surface of the runner on the adjacent end of the other shaft.

13. In an attrition mill, the combination of a supporting base having a plurality of angular seats on its upper side extending longitudinally thereof, rigid pedestals having angular lower corners fitting closely in said seats and detachably secured to said base, said pedestals having bearings slidably mounted thereon, and a shaft fitted in said bearings.

14. In an attrition mill, the combination of a supporting base having a plurality of angular seats on its upper side extending longitudinally thereof for their full length, rigid pedestals having angular lower corners fitting closely against oppositely disposed shoulders of said seats and secured to said base, said pedestals having bearings slidably mounted thereon, a shaft fitted in said bearings, and means for adjusting said slidably mounted bearings, whereby said shaft may be adjusted longitudinally.

15. The combination in an attrition mill having alined shafts with grinding disks thereon arranged in juxtaposition, of a supporting base, pairs of alined standards mounted on said base on opposite sides of said disks, a shaft journaled in bearings on each pair of standards, said base having seats for said standards arranged in alinement, the tops of said seats being smooth and all arranged in the same horizontal plane, and means for securing said standards to said base, whereby said shafts are positively and fixedly maintained in axial

alinement and the surfaces of the grinding disks maintained in parallel relation, thereby avoiding the necessity for tramming.

16. A supporting base for an attrition mill having a series of oppositely disposed seats thereon for supporting a series of standards carrying runner-shafts in axial alinement parallel with said seats, said seats having shoulders for confining the standards therebetween, the shoulders at each side of the base being arranged in alinement and the tops of said seats being smooth and all arranged in the same horizontal plane.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

JOHN S. SORENSEN.

Witnesses:

HELEN KENNELLY,

ELZA F. MCKEE.