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ADJUSTABLE TWO LAYERED SCREEN FOR HAMMER MILLS  
AND REMOTE CONTROL THEREFOR  
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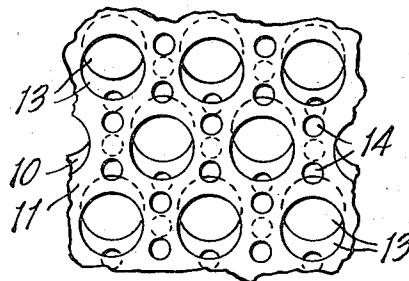
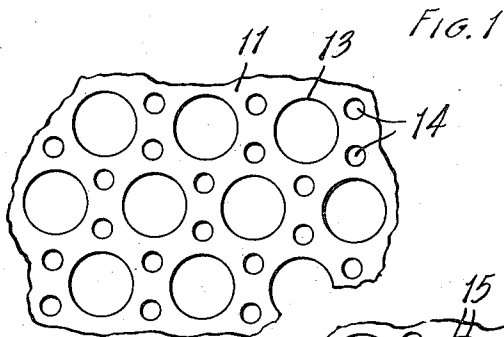
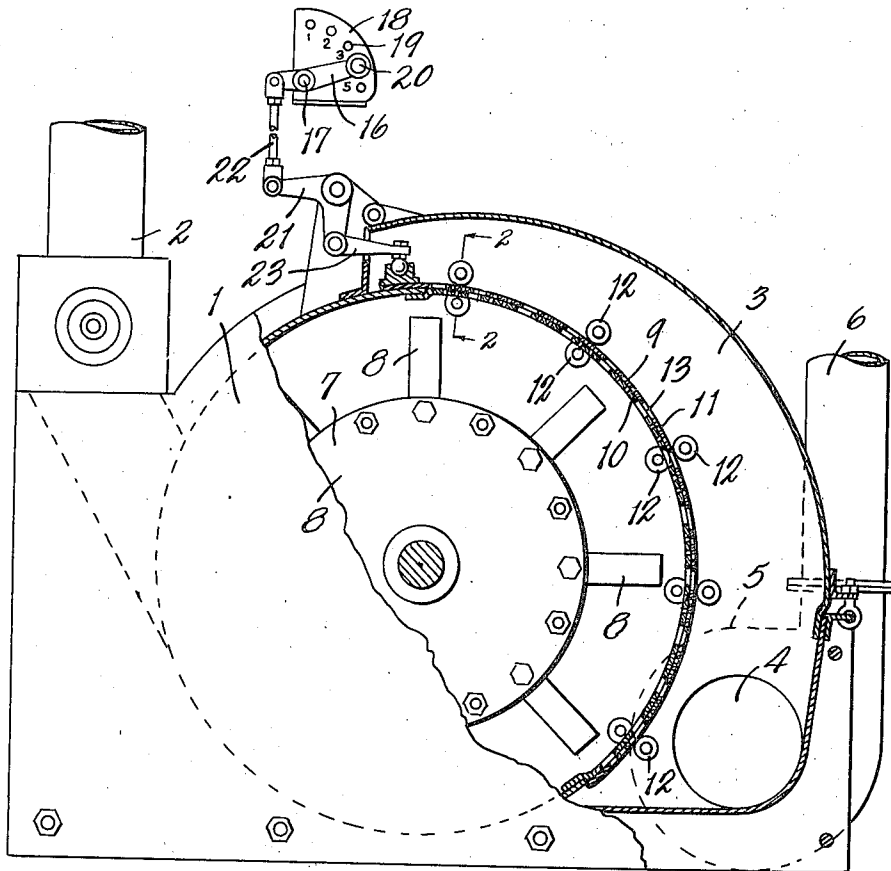


FIG. 3

FIG. 4

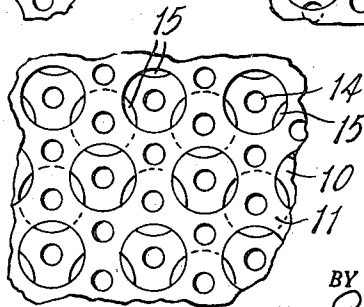
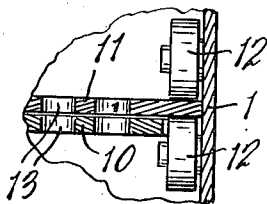


FIG. 2

FIG. 5

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# UNITED STATES PATENT OFFICE

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## ADJUSTABLE TWO LAYERED SCREEN FOR HAMMER MILLS AND REMOTE CONTROL THEREFOR

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8 Claims. (Cl. 241-89)

1

This invention relates to improvements in adjustable two layered screen for hammer mills and remote control therefor.

The main objects of this invention are:

First, to provide a grinding mill of the hammer type for grinding feed and the like with a screen which is adapted for remote control adjustment through a wide range.

Second, to provide a screen for grinding machines which is not likely to become clogged.

Third, to provide a screen having these advantages which may be installed in or embodied in grinding mills, particularly hammer mills, of types now in quite extensive use.

Fourth, to provide a structure having these advantages which is very compact.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary view partially in vertical section of a grinding mill or machine of the hammer type embodying the invention, certain of the parts being shown conventionally.

Fig. 2 is an enlarged fragmentary view mainly in section on line 2-2 of Fig. 1.

Fig. 3 is a fragmentary plan view of the screen in one position of adjustment, namely, fully open position.

Fig. 4 is a fragmentary plan view of the screen with the screen members adjusted to an intermediate position of adjustment.

Fig. 5 is a fragmentary plan view with the screen members adjusted to the extreme position of adjustment.

In Figs. 3, 4 and 5, the screen members are shown in the flat instead of being arcuate as shown in Fig. 1.

In the accompanying drawing, the housing 1 is mainly conventionalized and is provided with a grain feed chute 2, a discharge chamber 3 communicating at 4 with the blower conventionally indicated at 5 and having a discharge conduit 6. The rotor 7 is provided with hammers 8. All of these are shown mainly in conventional form and the details thereof form no part of our present invention.

In the embodiment of the invention illustrated, the screen designated generally by the numeral 9 constitutes a part of the wall of the housing and a partition between the milling chamber and the discharge chamber 3. This screen comprises

2

a relatively fixed arcuate screen member 10 and a coating slidably mounted screen member 11, these screen members being in concentric relation, the outer slidable member being supported by coating pairs of rollers 12 receiving the edges thereof as shown in Fig. 2. It is preferably supported out of sliding contact with the fixed member but closely associated therewith so that it has a wiping action as it is adjusted thereon, thus preventing the screen from becoming clogged.

These members 10 and 11 are formed of sheet metal of suitable gauge and both have corresponding or aligned rows of apertures comprising, in the preferred embodiment illustrated, relatively large apertures 13 and small apertures 14, there being in the embodiment illustrated two of the small apertures 14 between each adjacent pair of large apertures. In each of the rows extending in the direction of adjustment of the slidable screen member 11 a large aperture alternates with two small apertures, with both small apertures being longitudinally aligned in the row. The large apertures of adjacent rows are staggered and the rows of apertures are spaced less than the diameter of the large apertures so that when in certain positions of adjustment the large apertures overlap or partially register with the large apertures of adjacent rows, see Fig. 5.

In Fig. 3, the screen members are adjusted so that all of the apertures register thus providing a screen having both large and small apertures, the small apertures serving to increase the capacity of the screen so the small particles can pass therethrough.

Fig. 4 shows the screen members adjusted so that the large apertures of corresponding rows of the two screen members are in partial register, thus cutting down the size of the apertures.

In Fig. 5, the screen members are shown in their extreme position of adjustment so that the screen apertures consist of certain of the small apertures 14 which register centrally with the large apertures 13 and with certain other small apertures 14 of the two screen members registering with each other, there still being some overlap or register of the large apertures of corresponding rows, the large apertures however partially registering or overlapping with two of the large apertures of the adjacent rows, thus forming a screen made up of apertures 14 and 15 resulting from the coaction of the two screen members. This is the maximum adjustment for fine screening but it will of course be apparent that the size of the openings may be varied. Very satisfactory results, however, may be had when

the larger apertures are one-half inch in diameter and the small openings one-eighth.

These feed grinding hammer mills are commonly placed in the basement of the mill and it is therefore desirable to provide for a remote control or adjustment. To accomplish this, we provide an adjusting lever 16 pivoted at 17 and provided with a segment 18 having holes 19 receiving a detent 20 on the lever. The lever is connected to one arm of the rockshaft 21 by means of the link 22. The other arm of the rockshaft is connected by the drag link 23 with the slidable screen 11. The segment is preferably provided with indicia to indicate the adjusted position, there being five positions of adjustment in the device illustrated, the adjusting lever being in the fourth position as shown in the drawing. It is obvious that there might be any desired number of adjustments but ordinarily five positions are deemed sufficient.

We are aware that mills of this type have been provided with adjustable screens, one being shown for example in the Hughes Patent 2,227,090 in which the screen is adjusted laterally, the screen having three sections of different mesh. Other structures have been provided with interchangeable screens. One of the main objects of our invention is to provide a simple screen structure which has a wide range of adjustment, is compact, and may be adjusted by remote control. The importance of this will be understood when it is appreciated that these mills are largely so-called custom mills—that is, they grind relatively small batches of grain and succeeding customers very commonly require that the grain be ground to different degrees of fineness.

We have illustrated and described our invention in an embodiment which we consider very practical. We have not attempted to illustrate or describe other embodiments or adaptations as it is believed that this disclosure will enable those skilled in the art to embody or adapt our invention as may be desired.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In a grinding machine having a housing and a grinding member operatively mounted in the housing, a screen comprising relatively fixed and rotatably slidable arcuate members, each member having a plurality of rows of relatively large apertures and relatively small apertures in the rows between the large apertures, there being a plurality of small apertures between each pair of large apertures, the large apertures of adjacent rows being staggered, the rows of apertures being spaced less than the diameter of the large apertures, means for slidably supporting the slidable screen member through such range of adjustment that the apertures of the two members may be brought into register and so that the large apertures of adjacent rows may be brought into overlapping relation and certain of the small apertures of one screen member centrally positioned relative to the large apertures of the other screen member, and means for selectively adjusting said slidable screen member.

2. In a grinding machine having a housing and a grinding member operatively mounted in the housing, a screen comprising relatively fixed and rotatably slidable arcuate members, each member having a plurality of rows of relatively large apertures and having relatively small apertures in the rows between the large apertures, the large apertures of adjacent rows being staggered, the rows of apertures being spaced less than the diam-

eter of the large apertures, and means for slidably supporting the slidable screen member, said rows of large apertures in each screen member being disposed parallel to the direction of slidable movement of the slidable screen member, two small apertures alternating with a single large aperture in each row, said two small apertures being aligned longitudinally of the row, said large and small apertures being so spaced relative to each other in rows and the range of slidable adjustment of the slidable screen member being such that the apertures of the two screen members may be brought into substantial register and so that the large apertures of adjacent rows may be brought into overlapping partial registering relation and certain of the small apertures of one screen member are in register with the large apertures of the other screen member and simultaneously therewith certain other small apertures in one screen member are in register with certain other small apertures in the other screen member.

3. In a grinding machine of the rotatable hammer type having a housing wherein the hammers are rotatably mounted, of a discharge chamber associated with said housing, a screen between said housing and discharge chamber comprising relatively fixed and slidable arcuate members, each member having a plurality of rows of relatively large apertures, the apertures of adjacent rows being staggered and the rows of apertures being spaced so that they may be brought into partial overlapping relation, said screen members having a plurality of small apertures aligned in the rows with the large apertures, a large aperture and a plurality of small apertures alternating in each row and aligned longitudinally of the row, and means for adjusting the slidable screen member, said plurality of rows being parallel to the path of adjustment of said slidable member, the range of adjustment and the relative spacing of the large and small apertures being such that the corresponding large apertures of the rows may be brought into register or into partial overlapping relation with the large apertures of adjacent rows and such that certain small apertures may be brought into register with large apertures and simultaneously therewith certain other small apertures brought into register with each other.

4. In a grinding machine having a housing and a grinding member operatively mounted in the housing, a discharge screen for said housing comprising arcuate relatively fixed and slidable members, each member having rows of relatively large and relatively small apertures, the large apertures of the adjacent rows being staggered, the large apertures and the small apertures being relatively spaced in the members so that the large apertures of corresponding rows may be brought into register or into partial overlapping register with the large apertures of adjacent rows and with certain of the small apertures of one member centrally registering with the large apertures of the other member, and simultaneously therewith certain other small apertures of the members registering with each other, and means for adjustably supporting the slidable member in a plurality of selected positions of adjustment.

5. In a grinding machine having a housing and a grinding member operatively mounted in the housing, a discharge screen for said housing comprising arcuate relatively fixed and slidable members, each member having rows of relatively large and relatively small apertures, the large apertures of the adjacent rows being staggered, the

5

large apertures and the small apertures being relatively spaced in the members so that the large apertures of corresponding rows may be brought into register or into partial overlapping register with the large apertures of adjacent rows and so that certain small apertures are in register with large apertures and simultaneously there- with certain other small apertures are in register with each other, and means for adjustably supporting the slidable member in a plurality of selected positions of adjustment.

6. In a grinding machine, the combination with a housing and a grinding member mounted within the housing, of a discharge screen for said housing comprising arcuate relatively fixed and slidable members, each having corresponding aligned rows of apertures, each row having relatively large and relatively small apertures therein, the larger apertures of adjacent rows being staggered and the rows of apertures being spaced so that the large aperture of one row may be brought into partial overlapping register with the large aperture of the adjacent rows, the small apertures being spaced in the rows relative to the large apertures so that when the apertures of adjacent rows are in overlapping position certain of the small apertures of corresponding rows are in register with large apertures thereof, supporting rollers for the edges of the slidable screen member, an adjusting means for said slidable screen member comprising a hand lever, a coacting detent segment provided with indicia, and operating connections for said hand lever to said slidable screen.

7. In a grinding machine, the combination with a housing and a grinding member mounted within the housing, of a discharge screen for said housing comprising arcuate relatively fixed and slidable members, each having corresponding aligned rows of apertures, each row having relatively large and relatively small apertures therein, the larger apertures of adjacent rows being staggered and the rows of apertures being spaced so that the large aperture of one row may be brought into partial overlapping register with the large apertures of the adjacent rows, the small apertures being spaced in the rows relative to the large apertures so that when the apertures of adjacent rows are in overlapping position certain of the small

6

apertures of corresponding rows are in register with large apertures thereof and so that simultaneously therewith certain other small apertures are in register with each other, and means for adjusting said slidable member.

8. In a grinding machine, the combination with a housing and a grinding member mounted within the housing, of a discharge screen for said housing comprising arcuate relatively fixed and rotatably slidable members, each having corresponding aligned rows of apertures, the apertures of adjacent rows being staggered and the rows of apertures being spaced so that the aperture of one row may be brought into partial overlapping register with the apertures of the adjacent rows, supports for the edges of the slidable screen member, and an adjusting means for said slidable screen member comprising a hand lever, a coacting detent segment provided with indicia, and operating connections for said hand lever to said slidable screen, said operating connections including a link having one end pivotally connected to said slidable member, a bell crank lever having one arm pivotally connected to the other end of said link and a second link pivotally connecting the other arm of said bell crank lever to said hand lever.

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