

Jan. 12, 1932.

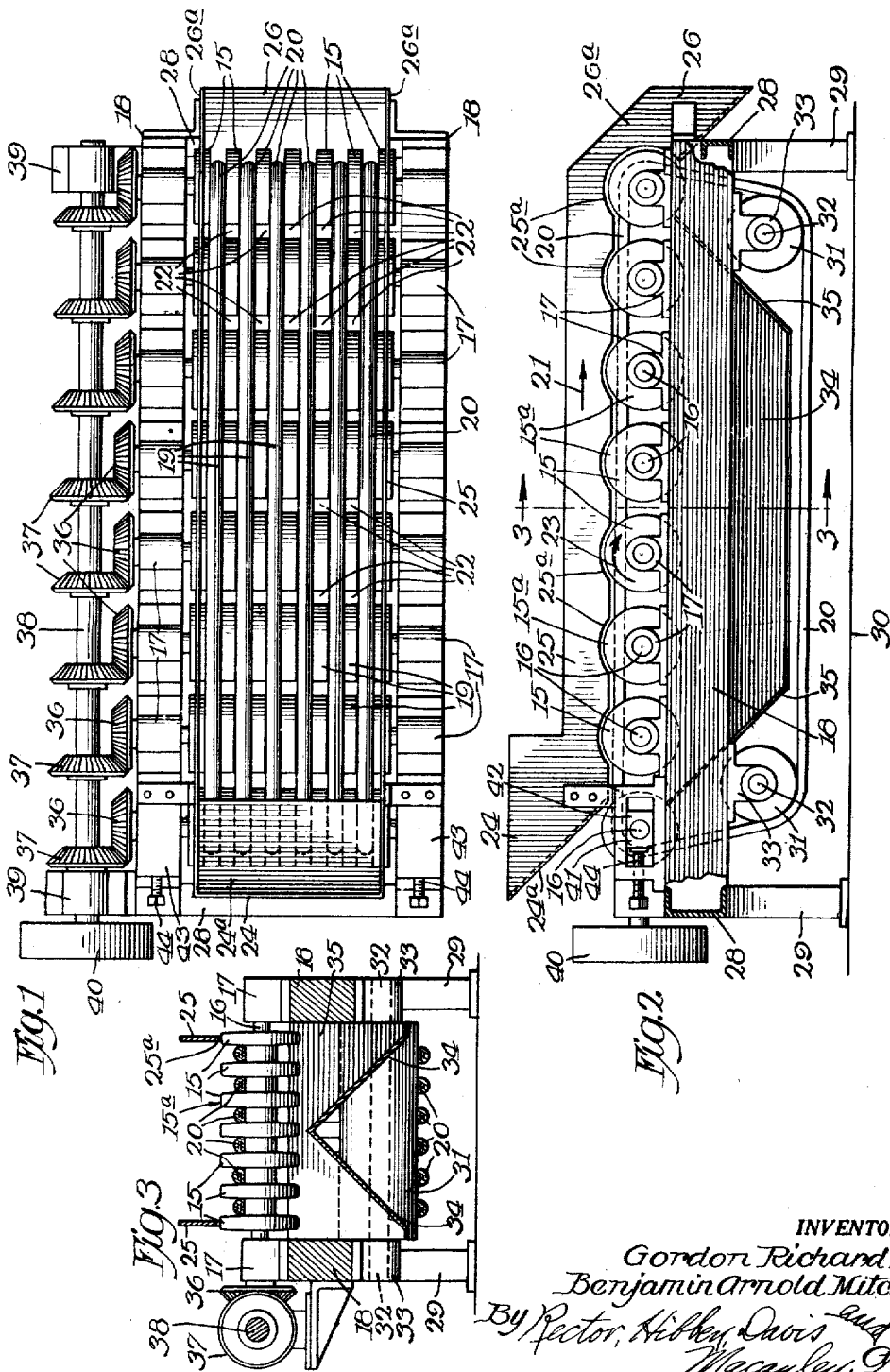
G. R. KYLE ET AL

1,841,333

CONVEYER GRIZZLY

Filed June 10, 1927

4 Sheets-Sheet 1



INVENTORS:

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Benjamin Arnold Mitchell

By Rector, Hickey, Davis and
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4 Sheets-Sheet 2

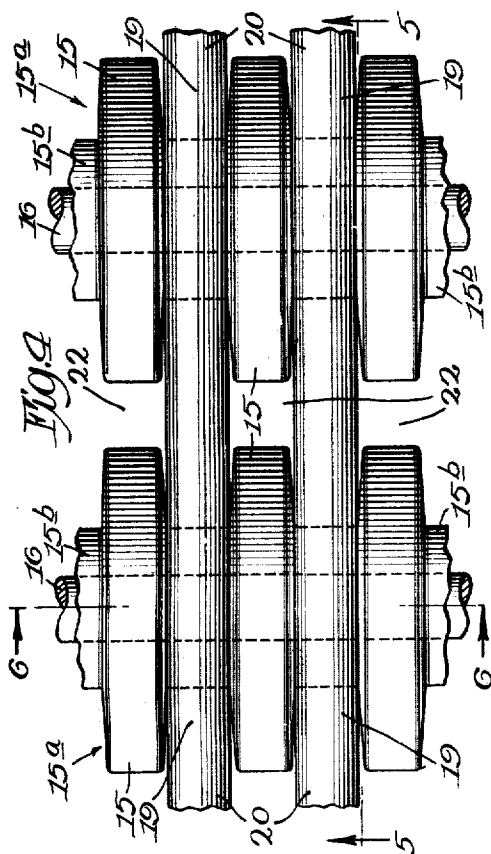


Fig. 4

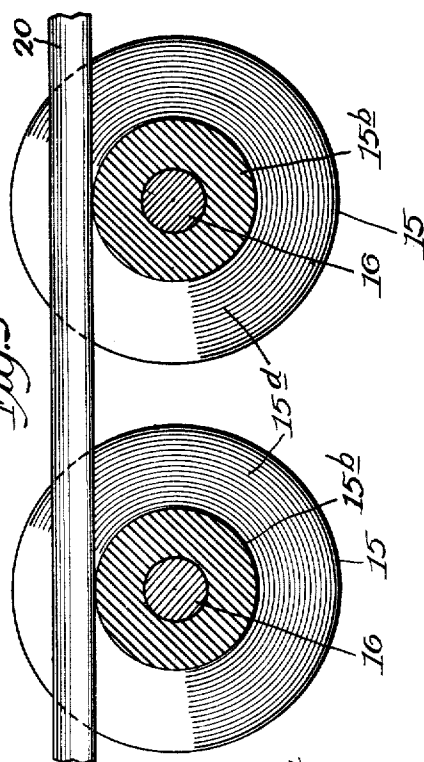


Fig. 5

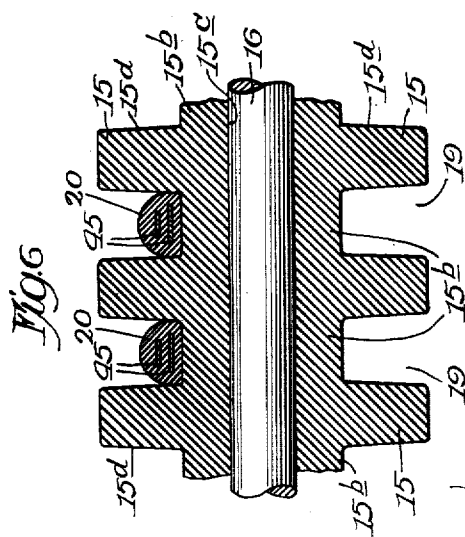


Fig. 6

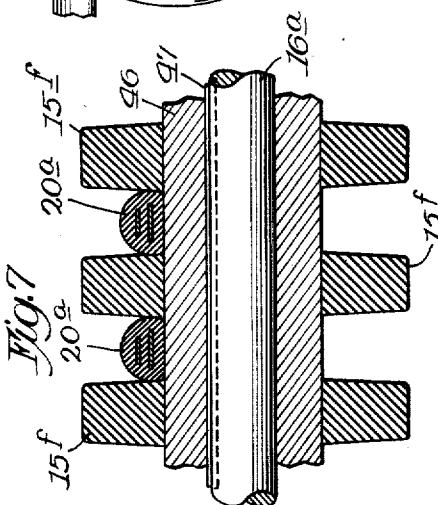


Fig. 7

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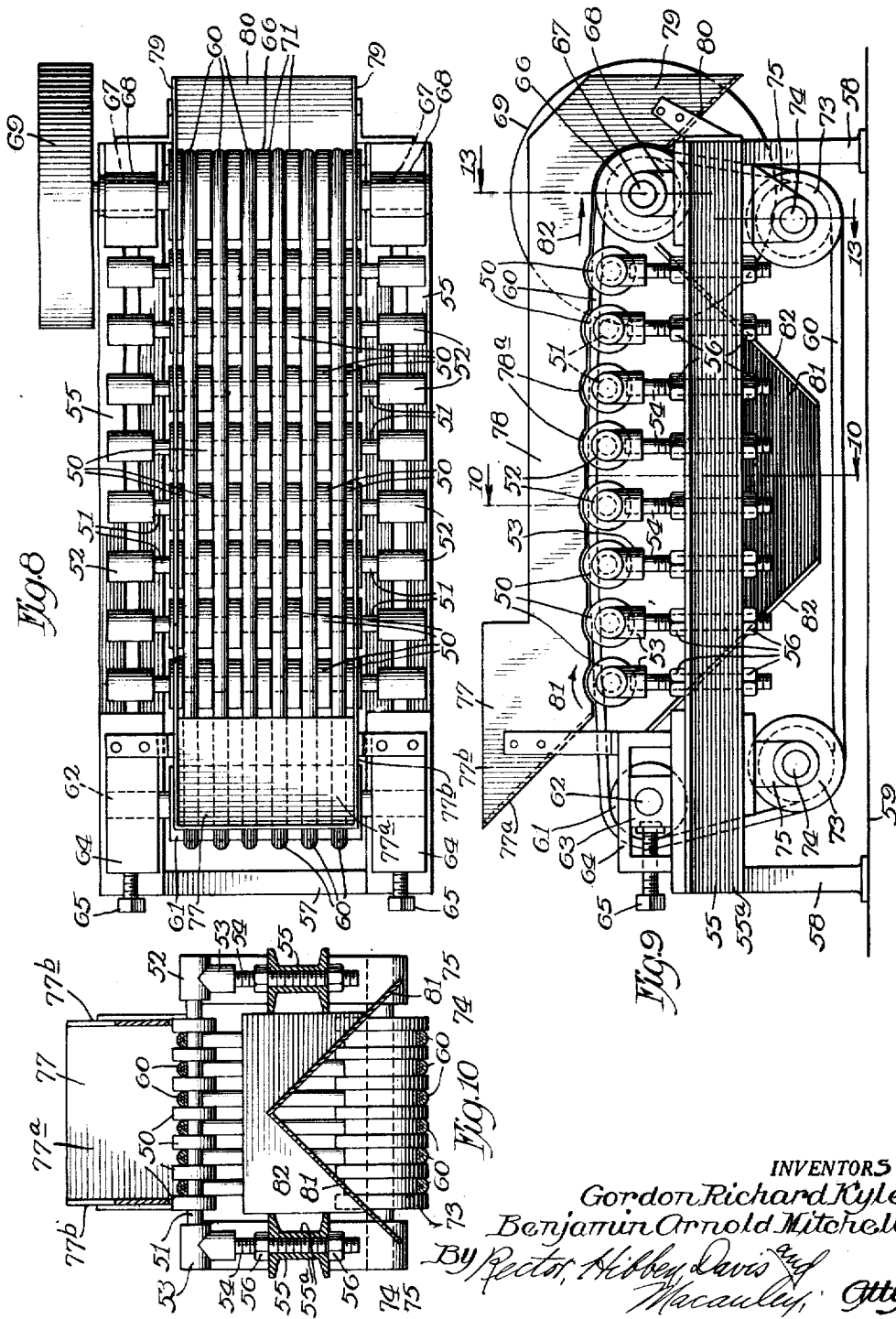
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4 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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CONVEYER GRIZZLY

Application filed June 10, 1927. Serial No. 197,794.

This invention relates to improvements in sizing or grading machines commonly known as grizzlies and its purpose is to provide a machine having improved sizing and conveying features in combination.

The principal object of the invention is to provide an improved grizzly adapted for use in sizing and grading quantities of materials made up of a plurality of pieces of different sizes, such as crushed ore, rock and the like. An important object of the invention is to provide a grizzly having conveyer elements combined with sizing or screening elements whereby the loose materials are conveyed more positively over the grizzly during the operation of sizing them. Still another important feature of the invention is the provision of a grizzly in which the surfaces contacting with the crushed or other loose materials are formed wholly or principally of rubber so that the life of the grading machine is greatly increased as compared with other machines of this class heretofore known. Another object of the invention is to provide a grizzly comprising a plurality of spaced rotating elements having endless conveyer belts interposed between them and cooperating with the rotating elements to form the screening apertures through which the sized materials or "fines" pass downwardly into the receiving hopper. A further object of the invention is to provide a grizzly having a plurality of sets of driven elements adapted by contact with endless conveyer belts to actuate these belts in unison with the movements of the driven elements. Another important object of the invention is to provide a conveyer having a plurality of endless conveyer belts in combination with a plurality of interposed rotating elements capable of adjustment for regulating the tension and inclination of the load contacting portion of the conveyer belts. Another object of the invention is to provide a grizzly comprising a plurality of endless load-conveying elements formed largely of rubber. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be under-

stood from the following specification taken with the accompanying drawings, in which two principal embodiments are illustrated. In the drawings Figure 1 shows a top plan view of one form of the improved grizzly.

Fig. 2 shows a side elevation of the structure illustrated in Fig. 1;

Fig. 3 shows a transverse vertical section taken on the line 3—3 of Fig. 2;

Fig. 4 shows an enlarged partial top plan view of the conveyer structure illustrated in Fig. 1, illustrating the relative arrangement of the rotating disks and the intervening endless belts;

Fig. 5 shows an enlarged vertical section on the line 5—5 of Fig. 4;

Fig. 6 shows an enlarged vertical section taken on the line 6—6 of Fig. 4;

Fig. 7 shows an enlarged vertical section similar to that of Fig. 6, illustrating a modified method of forming a series of the rotating disks in spaced relation to each other;

Fig. 8 shows a top plan view of a modified form of the invention in which the endless conveyer belts are driven and they in turn act as the driving means for rotating the intervening disks;

Fig. 9 shows a side elevation of the structure illustrated in Fig. 8;

Fig. 10 shows a transverse vertical section taken on the line 10—10 of Fig. 9;

Fig. 11 shows a partial side elevation of the structure illustrated in Fig. 9, showing a longitudinal vertical section through the shafts of two of the series of rotating disks;

Fig. 12 shows a vertical section taken on the line 12—12 of Fig. 11; and

Fig. 13 shows an enlarged vertical section taken on the line 13—13 of Fig. 9.

Referring to the first embodiment of the invention, illustrated in Figs. 1, 2, and 3, the improved grizzly is shown as comprising a plurality of rotatable disks 15 which are arranged in a plurality of separate groups or series 15^a, the axes of rotation of the disks of each series being parallel to the axes of rotation of all of the other disks and the disks of each group or series being of the same size so that their peripheral surfaces, if extended laterally, would form a common cylindrical

surface. All of the disks 15 in separate series are also preferably of the same diameter. The disks 15 of each group 15^a are mounted on a common shaft 16 rotatable in bearings 17, fixed on the side frame members 18 of the machine. All of the disks 15 mounted on each shaft 16 are spaced apart longitudinally of the shaft as shown at 19 and the spaces 19 between the disks on one shaft are arranged in longitudinal alignment with the corresponding spaces 19 between the disks on all of the other shafts, thus providing a succession of aligned spaces adapted to receive the upper runs or stretches of the conveyer belts 20 which are endless belts having their upper runs adapted to travel in the direction indicated by the arrow 21 and having their lower runs returning beneath the machine as shown particularly in Fig. 2. The shafts 16 upon which the disks 15 are mounted are so spaced apart longitudinally of the machine with reference to the diameters of the disks that intervening spaces 22 are provided between the adjacent portions of the peripheral surfaces of the disks mounted on adjacent shafts, as shown in Fig. 1, thus providing openings between the adjacent rotating disks and between the next adjacent traveling belts which constitute the screening openings. These openings 22 are shown as being substantially rectangular in cross-section but may be of any desired configuration depending upon the spaced relation of the disks and their thickness. The disks 15 rotate in the direction indicated by the arrows 23 and the materials to be sized or graded are introduced onto the upper surfaces of the sizing elements at the left-hand end of the machine, as viewed in Figs. 1 and 2, preferably being allowed to slide down onto the sizing and grading elements of the machine over the inclined lower wall 24^a of the receiving hopper 24. This hopper 24 has its side walls united with the side walls 25 which extend longitudinally of the machine at the ends of the series of rotating disks, inwardly of the side frame members 18. These side walls 25, which retain the loose materials in position on the movable sizing and grading elements, are mounted over the endmost disks of each series of disks and their lower edges are cut away along curved lines as shown at 25^a to accommodate the peripheral surfaces of the disks which pass in close proximity to the curved surfaces. At the discharge end of the machine, the side walls 25 are united with the side walls 26^a of a discharge chute 26 through which the oversized materials are discharged from the grizzly in a pile separate from the fines or graded materials which have passed through the openings 22.

The side frame members 18 of the machine are united by transverse frame members 28 and the rigid supporting frame thus formed is mounted on legs or stands 29 which are

secured to the floor or foundation 30. The lower stretches of the endless conveyer belts 20 are passed around idler rolls or pulleys 31 located adjacent the ends of the under side of the supporting frame and mounted on shafts 32 which are journaled in bearings 33 fixed on the under sides of the side frame members 18. The loose materials which pass through the spaces 22 between the disks and between the upper stretches of the conveyer belts are prevented from passing downwardly onto the lower stretches of the belts by means of the longitudinally extending deflecting walls 34 which are united at their upper edges and which extend downwardly and laterally as shown in Fig. 3, terminating outwardly of the outermost conveyer belts so that the loose materials which have been graded by the action of the grizzly are discharged downwardly onto the foundation 30 adjacent the sides of the machine. At the ends of the deflecting walls 34, other downwardly and inwardly inclined deflecting walls 35 are provided to prevent the graded materials from passing onto the idler rolls 31. The deflecting walls 35 are united with the deflecting walls 34 along their meeting lines, thus forming a double lateral discharge hopper or chute.

In the form of the invention illustrated in Figs. 1, 2, and 3, the several shafts 16 upon which the rotatable disks 15 are mounted, are separately driven. For this purpose, the adjacent ends of the shafts are provided with fixed bevel gears 36 each adapted to mesh with a bevel gear 37 fixed on a longitudinal driving shaft 38 having bearings 39 which are secured to one of the side frame members 18. The shaft 38 is provided at one end with a pulley 40 which may be connected by a belt or the like to an electric motor or other source of motive power. In this way, all of the rotatable disks 15 are positively driven with the same peripheral speed and the endless conveyer belts 20 are in turn driven by frictional contact with the shafts or rolls upon which the disks 15 are mounted, as herein-after more fully explained. In order that the conveyer belts 20 may be maintained in a taut position so that they will be positively driven by the rotation of the parts upon which the disks 15 are mounted, the endmost shaft 16 is preferably journaled in bearing blocks 42 which are mounted to slide in guides 43 and which are arranged to have engagement with adjusting screws 44 threaded to the end walls of the guides 43 so that when the screws are rotated the bearing blocks 42 may be caused to slide longitudinally of the machine for the purpose of varying the tension of the conveyer belts 20 as desired.

The rotatable disks 15, or at least the wearing surfaces thereof, are formed preferably of rubber having great abrasion-resisting qualities. One form of such construction is

illustrated in Fig. 6 where the disks 15 are shown as being formed entirely of rubber and as integral parts of a central hub or cylinder 15^b which is fixed securely on the shaft 16 which may be accomplished by forming the central bore 15^c of the hub portion 15^b of such diameter that it will have a close fit on the shaft 16 when the parts are assembled. In this construction, the part 15^b as well as the radiating disks 15 are formed of rubber. The disks 15 are spaced apart on the drum portion 15^b to leave an intervening space adapted to receive the conveyer belts 20, the upper stretches of which are supported on the drums 15^b and are driven thereby in the form of the invention illustrated in Figs. 1, 2, and 3. The sides 15^a of the disks 15 are tapered outwardly and radially as shown particularly in Figs. 4 and 6 so that the lateral surfaces of the disks diverge from the lateral or side surfaces of the upper stretches of the belts 20, as shown in Fig. 4, thereby preventing small particles of the crushed materials from lodging between the disks and the belts and thus grinding off the surfaces thereof. As the disks rotate, the inclined lateral surfaces thereof tend to dislodge any small particles of materials which may tend to pass between the sides of the belts and the lateral surfaces of the disks. The disks 15 are preferably spaced apart and the belts 20 so formed that the belts will fit closely between the disks at the bottom or inner edges thereof, as shown in Fig. 6. The belts 20 have flat inner surfaces adapted to ride on the cylindrical surfaces of the drums or hubs 15^b and their outer portions are formed with a substantially semicircular contour, the entire belt being formed largely of rubber having great abrasion-resisting qualities and relatively great tensile strength but being preferably provided also with one or more continuous webs or layers 45 of fabric or other similar material adapted to increase the tensile strength of the belts and thereby enable them to be maintained in a taut condition when in use.

In Fig. 7 of the drawings there is illustrated a modified method of mounting the disks on the supporting shafts. In this modification, the disks 15^t which are similar in shape and form to the disks previously described are formed of rubber and are mounted on a drum or cylinder 46 which is formed of metal and which is secured on the shaft 16^a by means of a key 47 or other fastening means. The disks 15^t are spaced apart to receive the upper stretches of the conveyer belts 20^a between them, these belts being of the same form and construction as the belts previously described. The disks 15^t are secured in place preferably by forming the inner bores thereof of the required size so that they may be slipped into place when wet and then allowed to become fixed

on the metal drum upon drying out. In case the conveyer belts are positively driven and the disks 15^t are rotated by the driving action of the belts 20^a, as in the embodiment of the invention hereinafter described, the shafts 16^a may be stationary and the drums 46 may be allowed to rotate upon them, but to reduce the wearing surfaces of the movable parts, the arrangement shown in Fig. 7 is preferably employed.

The form of the invention shown in Figs. 8, 9, 10, 11, 12 and 13 differs primarily from the form of the invention heretofore described in that all of the rotatable disks are mounted on idler shafts and the conveyer belts are positively driven, these belts acting in turn as the driving means for actuating the rotatable disks. In this modified form, a plurality of circular disks 50 are spaced apart on transverse horizontal shafts 51 having their ends journaled in bearings 52. The bearings 52 are mounted on socket members 53 which engage the upper ends of studs 54 extending downwardly through the side frame members 55. The side frames 55 are preferably made up of channel bars 55^a which are spaced apart with their flanges directed outwardly from each other as shown in Figs. 10 and 12 so that the studs 54 are permitted to extend downwardly between them through the longitudinal slots formed thereby. The upper and lower portions of each stud 54 are engaged by nuts 56 which may be adjusted to clamp the studs rigidly in place in any desired position longitudinally of the side frame members. The side frame members 55 are connected by end frame members 57 and the entire frame structure is supported on legs or stands 58 adapted to be secured in place on the floor or foundation 59.

The disks 50 are spaced apart on the shaft 51 to leave longitudinally aligned spaces between them adapted to receive the endless conveyer belts 60 formed largely of rubber and having preferably strips of fabric or the like imbedded therein to increase their tensile strength. At the head end of the machine, the endless belts 60 pass around an idler drum or pulley 61 which is mounted on a shaft 62 journaled in bearing blocks 63. These blocks are mounted for adjustment longitudinally of the machine in guideways 64 secured on the side frame members 55 and this adjustment is effected by means of adjusting screws 65 threadedly engaging the end walls of the guideways 64 and having a rotatable driving engagement with the blocks 63 so that when the screws are adjusted the blocks are moved longitudinally in the guideways to vary the position of the roll 61 and thereby regulate the tension of the belts 60. At the rear or discharge end of the machine, the belts 60 pass around a driving drum or pulley 66 which is mounted

on a shaft 67 journaled in bearings 68 secured to the side frame members 55. The drum or pulley 66 has a fixed driving engagement with the shaft 67 and the projecting end of this shaft at one side of the machine has a driving pulley 69 secured thereon so that the drum 66 may be positively driven by means of a motor or the like connected by a belt with the pulley 69. As shown particularly in Fig. 13, the drum or pulley 66 is provided with a plurality of annular grooves or recesses 70 to receive the belts 60 thus forming a plurality of intermediate projecting annular flanges 71, the outer surfaces of which may be substantially flush with the outer surfaces of the belts 60 as these belts pass around the drum. At the ends of their lower stretches, the belts 60 are passed around idler drums or pulleys 73 which are fixed on shafts 74 journaled in bearings 75 carried by brackets secured to the under sides of the frames 55. The drums 73 are preferably of the same construction as the drum 66 so that the proper lateral spaced relation of the belts 60 is maintained throughout their lower stretches.

The material to be screened or sized by the apparatus illustrated in Figs. 10 to 13 inclusive, is introduced onto the upper surface of the sizing apparatus at the head end of the machine through a feeding hopper 77 having an inclined end wall 77^a and side walls 77^b so that the materials to be screened are directed downwardly toward the space occupied by the first series of rotatable rolls 50. The side walls 77^b of the feeding hopper are extended longitudinally of the machine to form side walls 78 which are located above the outermost disks 50 of each series and notched out on their under sides as shown in 78^a to receive the upper portions of these disks. At the discharge end of the machine, the side walls 78 unite with downwardly inclined continuations 79 connected by a bottom wall 80 which forms a discharge chute for the oversized particles which do not pass through the grading mechanism. The materials which pass through the screening device fall downwardly onto the inclined deflecting plates 81 which are united along their upper edges and which incline downwardly and laterally to discharge the graded materials at the sides of the machine and prevent the falling thereof on the lower runs of the conveyer belt. Other inclined deflector plates 82 extend downwardly and inwardly from the upper rolls at the ends of the machine to prevent the falling of the materials on the lower rolls 73, thus forming a double lateral discharge hopper similar to that previously described.

In the operation of the form illustrated in Figs. 8 to 13 inclusive, the belts 60 are positively driven by the driving roll 66 and they in turn drive the disks 50 through frictional

engagement with the peripheral surfaces of the shafts 51 on which the disks are mounted. The shafts 51 are preferably sufficiently large in diameter to form a good frictional driving engagement with the belts and to cause the disks 50 to be rotated at the required speed, it being understood that the disks rotate in the direction indicated by the arrows 81 and that the belts 60 travel in the direction indicated by the arrow 82. The lateral sides of the disks 50 are converged outwardly as shown at 50^a in Fig. 12, similar to the disks heretofore described, so that the wedging of particles between the belts and the disks is prevented.

As heretofore indicated, the spaced relation of adjacent series of disks may be regulated by adjusting the studs 54 longitudinally in the slots of the side frames 55 and the variation in the grading action and in the speed of rotation of the disks may also be effected by removing any of the shafts 53 and replacing them with other shafts of different diameter or having disks of different diameter thereon. This replacement is readily permitted by reason of the detachability of the bearing members whose sockets 53 may be lifted off of the studs 54 after the belts 60 have been sufficiently loosened by the inward adjustment of the bearing blocks 63. The studs 54 are preferably so adjusted that the uppermost portions of the peripheral surfaces of the successive shafts 51 lie on an arc or curve as shown in Fig. 9. This adjustment may be utilized to tighten the conveyer belts 60 but after the desired curved relation of the successive shafts 51 has been attained, the subsequent tightening of the belts 60 which may be required during the continued use of the apparatus, may preferably be effected by the adjustment of the bearing blocks 63.

In both of the principal forms of the invention herein described, the rotatable disks may be formed largely or wholly of rubber having abrasion-resisting qualities and the disks are of such diameter that the uppermost portions project above the upper surfaces of the upper stretches of the belt. In this way, any particles which are too large to pass through a particular screening space between successive disks are compelled to ride up over the next disk or, by a lateral movement thereof, they are carried along by the intervening conveyer belts. The combination of the belts with the rotatable disks produces a positive progressive forward motion of the material to be graded and at the same time produces an effective agitation thereof so that materials of the proper size to be graded are presented to the spaces between the disks before the discharge end of the machine is reached. The relative sizes of the disks with respect to the thickness of the belts and the consequent projection of the disks

above the upper surfaces of the belts will, of course, vary with the speed of operation and the character of the material being graded. In either form of the invention, the use of
 5 rubber in the construction of the rotatable disks and the conveyer belts is of material advantage in increasing the life of these parts and also in maintaining an effective driving engagement between them during the operation
 10 of the machine.

Although certain forms of the invention have been shown and described by way of illustration, it will be understood that this invention may be constructed in various other
 15 embodiments within the scope of the appended claims.

We claim:

1. The combination in a grizzly of rotatable disks spaced apart longitudinally of the
 20 grizzly to regulate the sizes of pieces passing between them, and traveling conveying members mounted between said disks, said disks extending continuously above the upper surfaces of said conveying members to agitate
 25 the materials thereon.

2. The combination in a grizzly of a plurality of rotatable disks arranged in successive groups, those of one group being spaced
 30 from those of the next adjacent group to regulate the sizes of the particles passing therebetween, the disks in each group being spaced apart, and conveying members extending through the spaces between the disks of each group.

3. The combination in a grizzly of a plurality of rotatable disks arranged in successive groups spaced apart longitudinally of the grizzly to provide sizing openings, those
 40 of one group being spaced from those of the next adjacent group, the disks in each group being spaced apart, and endless conveyer belts extending through the spaces between the disks in each group, said disks extending continuously above said belts.

4. The combination in a grizzly of a plurality of rotatable disks arranged in successive parallel groups, the disks in each group
 50 being spaced apart with the spaces of one group in alignment with those of the other groups, and endless conveyer belts mounted to travel in said aligned spaces, the adjacent groups of disks being spaced apart to regulate the sizes of the particles passing therebetween.

5. The combination in a grizzly of a rotatable member, a pair of disks fixed on said member and spaced apart, said disks having
 60 their lateral faces converging outwardly from said member, and a movable conveyer element contacting with said member between said disks, said conveying member being a solid continuous member having a curved outer surface and a flat inner surface.

6. The combination in a grizzly of a plurality of parallel rotatable shafts, driving

means for positively driving said shafts in unison, sizing disks mounted on said shafts, said shafts being spaced apart to provide
 70 sizing openings between the disks on adjacent shafts, and additional relatively movable conveying means extending endlessly between laterally spaced disks for advancing materials over said disks.

7. The combination in a grizzly of a plurality of rotatable disks arranged in groups,
 75 the disks of adjacent groups being spaced apart to provide sizing openings to determine the sizes of particles passing therethrough, means for driving said disks, and additional relatively movable conveying means extending
 80 endlessly between laterally spaced disks for advancing materials over said disks.

8. The combination in a machine for grading materials of a plurality of rotatable non-traveling sizing elements spaced apart longitudinally of the machine, means for varying
 85 independently the elevation of said sizing elements, and endless conveying elements associated with said sizing elements.

9. The combination in a machine for grading materials of a plurality of rotatable non-traveling sizing elements spaced apart, means
 90 for varying the elevation and spaced relation of said sizing elements, and endless conveying elements associated with the lateral sides of said sizing elements.

10. The combination in a grizzly of a plurality of rotatable sizing disks arranged in groups spaced apart longitudinally of the
 100 grizzly, endless belts of uniform width having their upper stretches extending through the spaces between said disks, means for varying the spaced relation of adjacent groups of said disks, and drums for supporting said
 105 belts at the ends of the upper stretches thereof.

11. The combination in a grizzly of a plurality of groups of rotatable disks, the disks in each group being spaced apart, a plurality
 110 of endless conveying elements mounted to travel in the spaces between the disks of said groups, said disks of adjacent groups having their peripheral edges spaced apart, whereby there are formed a plurality of uniform sizing openings whose dimensions are determined by the spaced relation of said endless
 115 conveying elements and the spaced relation of the disks of adjacent groups.

12. The combination in a grizzly of a plurality of groups of rotatable disks the disks
 120 in each group being spaced apart a plurality of endless conveying elements mounted to travel in the spaces between the disks of said groups said disks of adjacent groups having their peripheral edges spaced apart whereby
 125 there are formed a plurality of uniform sizing openings whose dimensions are determined by the spaced relation of said endless conveying elements and the spaced relation
 130 of the disks of adjacent groups said sizing

openings having substantially the same dimensions longitudinally and transversely of the grizzly.

13. The combination in a grizzly of a plurality of groups of disks having the disks of each group spaced apart and arranged with adjacent groups spaced apart to form sizing openings between the peripheral edges of the disks a plurality of endless conveying belts formed largely of rubber and mounted to travel between the lateral faces of adjacent disks of successive groups of disks and means for positively driving the disks of each group.

14. The combination in a grizzly of a plurality of endless conveying belts spaced apart and extending throughout the length of the grizzly a plurality of groups of rotatable disks having the disks of each group spaced apart to receive said endless conveying belts between adjacent disks said groups of disks being spaced apart to form relatively small sizing openings between their peripheral edges and between adjacent endless belts, said disks and said endless conveying belts having their wearing surfaces formed of rubber.

15. The combination in a grizzly of a plurality of endless conveying belts spaced apart and extending throughout the length of the grizzly, a plurality of groups of rotatable disks having the disks of each group spaced apart to receive said endless conveying belts between adjacent disks, said groups of disks being spaced apart to form relatively small sizing openings between their peripheral edges and between adjacent endless belts, said disks and said endless conveying belts having their wearing surfaces formed of rubber, and means for positively driving the disks of each group independently of the disks of the other groups.

16. The combination in a grizzly of a plurality of groups of disks having the disks of each group spaced apart with the spaces of successive groups in alignment, said groups being spaced apart longitudinally of the machine relatively short distances to form sizing openings, a plurality of endless conveyer belts mounted to travel with their upper stretches between adjacent disks in said aligned spaces, said endless conveyer belts being formed largely of rubber, and means for driving said disks, said endless conveyer belts being moved by frictional contact with said disks.

17. The combination in a grizzly of a plurality of groups of disks mounted for rotation and having the disks in each group spaced apart, a plurality of endless conveyer belts mounted to travel between adjacent disks, supporting means between adjacent disks on which said endless conveyer belts rest, and means for independently adjusting the elevation of each group of disks and the associated supporting means.

18. The combination in a grizzly of a plu-

ality of groups of rotatable disks having the disks in each group spaced apart, a plurality of endless conveyer belts mounted to travel in the spaces between adjacent disks, the adjacent groups of disks being spaced apart to form sizing openings, and means for independently adjusting the spaced relation of adjacent groups of disks to vary said sizing openings.

19. The combination in a grizzly, of a plurality of rotary members distributed with substantial uniformity over the area of the conveying portion of the grizzly, said rotary members being spaced apart longitudinally of the grizzly to provide intervening sizing openings of substantially uniform size between adjacent groups of rotary members, the rotary members of each group being spaced apart transversely of the grizzly, and a plurality of traveling conveying elements mounted in the recesses formed by the transverse spacing of said disks, said rotary members extending continuously above said traveling elements to agitate the materials conveyed and assist in the motion thereof.

20. The combination in a grizzly, of a plurality of rotatable disks spaced apart longitudinally of the grizzly to regulate the sizes of the pieces passing between them, said disks being also spaced apart transversely of the grizzly, and traveling conveying members movable longitudinally of the grizzly and located in the recesses formed by the transverse spacing of said disks.

21. The combination in a grizzly, of a plurality of parallel shafts, a plurality of disks mounted on each of said shafts and spaced apart thereon, the disks on adjacent shafts being spaced apart to provide sizing openings, a plurality of endless conveyer belts supported from said shafts between said disks and movable longitudinally of the grizzly to form the lateral boundaries of said sizing openings, and means for separately and positively driving each of said shafts.

22. The combination in a grizzly, of a plurality of rotatable sizing elements arranged in groups spaced apart longitudinally of the grizzly, said sizing elements being also spaced apart transversely of the grizzly to form a series of recesses aligning with each other, endless conveying elements mounted to travel longitudinally of the grizzly in said aligned recesses, and means for varying the spaced relation of adjacent groups of sizing elements to vary the sizing openings.

23. The combination in a grizzly, of a plurality of rotatable sizing elements arranged in groups spaced apart longitudinally of the grizzly, said sizing elements being also spaced apart transversely of the grizzly to form a series of recesses aligning with each other, endless conveying elements mounted to travel longitudinally of the grizzly in said aligned recesses, and means for independently vary-

ing the elevation of different groups of sizing elements to change the contour of the conveying portion of the grizzly.

In testimony whereof, we have subscribed
5 our names.

GORDON RICHARD KYLE.
BENJAMIN ARNOLD MITCHELL.

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BENJAMIN ARNOLD MITCHELL.

10

CERTIFICATE OF CORRECTION.

Patent No. 1,841,333.

Granted January 12, 1932, to

GORDON RICHARD KYLE ET AL.

It is hereby certified that the residence of the first named patentee was erroneously written and printed in the grant as "West New Hampshire" and in the heading to the specification as "West New Brighton, Staten Island, New York", whereas said residence should have been written and printed as Belleville, New Jersey, as shown by the records of assignments in this office; page 5, claim 12, line 120, after "disks", lines 121 and 125, after "apart", and lines 124 and 130, after "groups" insert a comma; page 6, line 5, claim 13, after "disks" first occurrence and line 9, after "disks" insert a comma; same page, line 17, claim 14, after "grizzly" and line 20, after "disks" first occurrence, insert a comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of February, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

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