C. H. HERSEY.

GRADER.

APPLICATION FILED DEC. 10, 1909.

1,011,196.

Patented Dec. 12, 1911.

2 SHEETS—SHEET 1.

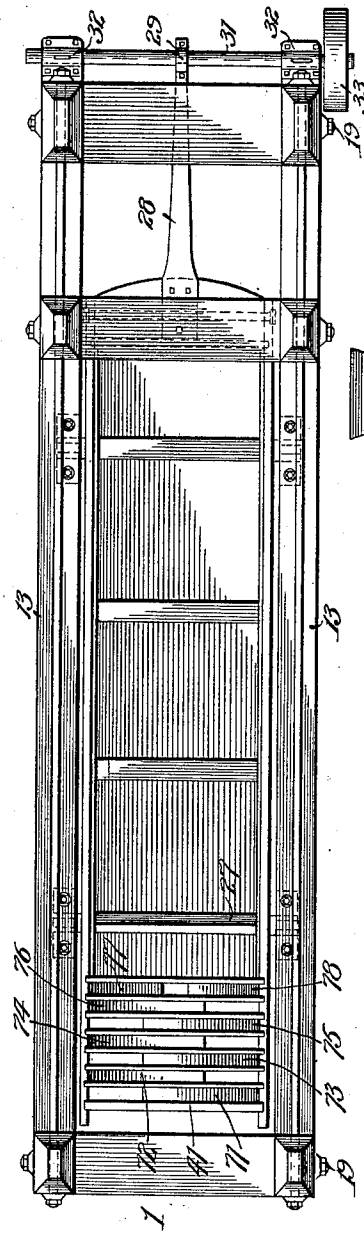

Fig. 1.

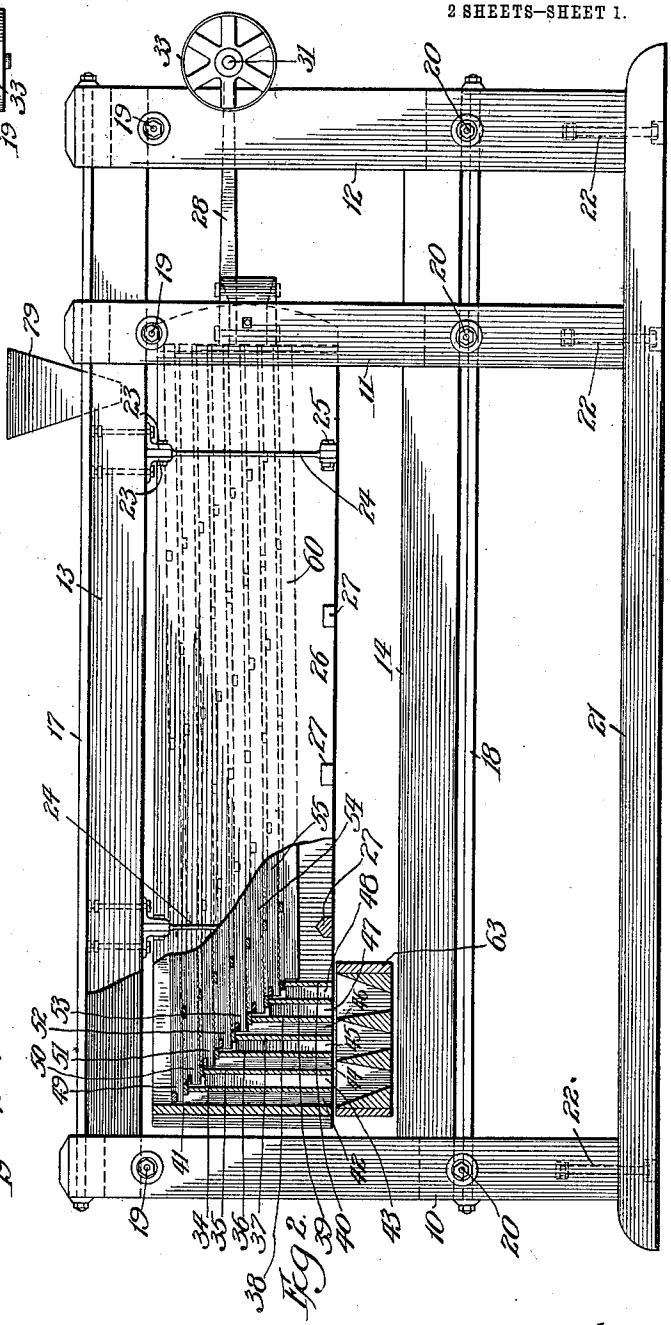

Fig. 2.

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2 SHEETS—SHEET 2.

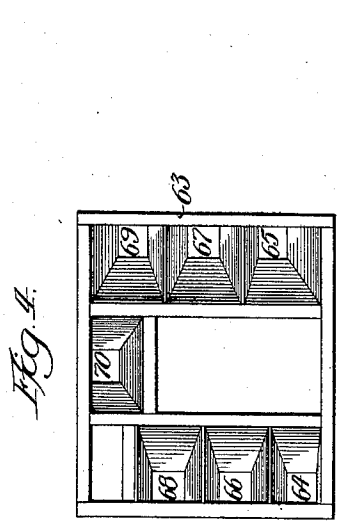

Fig. 4.

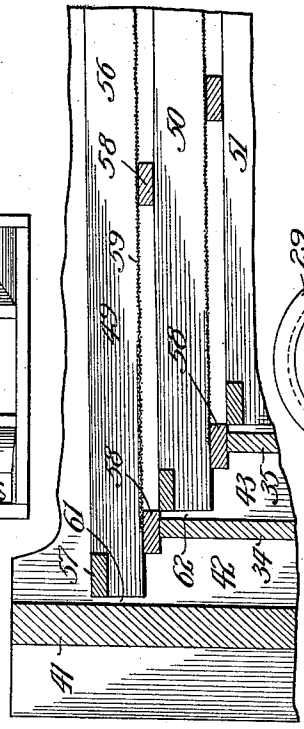

Fig. 5

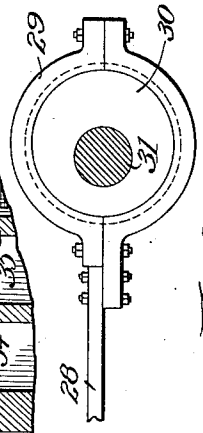

Fig. 6

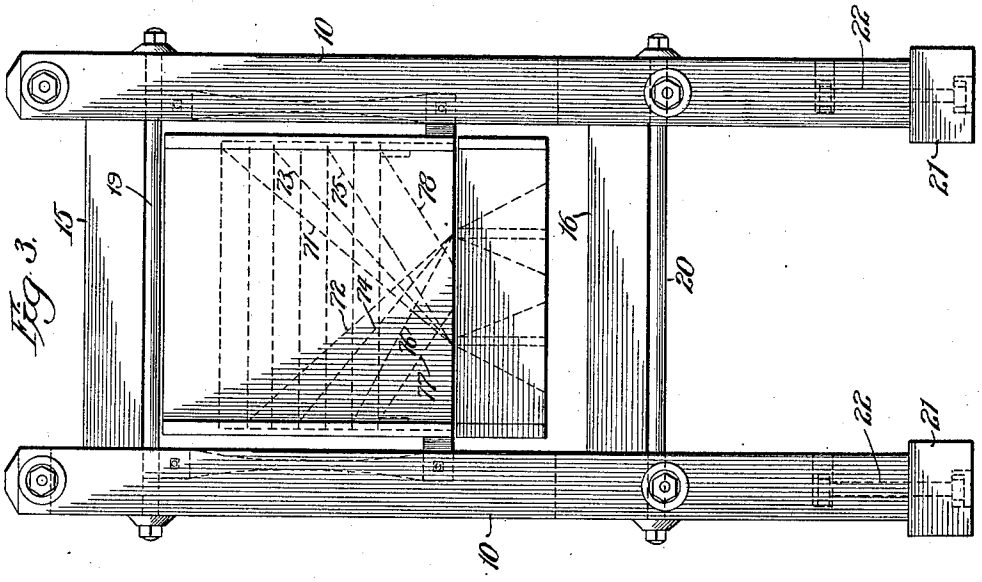

Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES H. HERSEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO ARMOUR & COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

GRADER.

1,011,196. Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed December 10, 1909. Serial No. 532,303.

To all whom it may concern:

Be it known that I, CHARLES H. HERSEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Graders, of which the following is a specification.

My invention relates to graders or sifting appliances for sand or the like whereby to effect the division of a body of material into portions of different caliber or size, such, for example, as is necessary in the manufacture of sandpaper of different grades of coarseness.

The main and leading object and aim of the invention is the provision of a device or machine of this character which shall have large capacity and at the same time occupy but small floor space and consume but a comparatively small amount of power. The large capacity of a small machine of this type compared with the use of a number of machines each with a single sieve, or screen, requires the use of but a single eccentric mechanism as contrasted with one or more for each of the larger machines, and inasmuch as the bearings or wearing surfaces of such eccentrics or cams wear out rapidly considerable saving is effected in the new style of machine in the time and effort necessary to effect repairs.

In the preferred embodiment of the invention I employ a plurality of superposed screens of graduated mesh and of graduated length, whereby the independent and separate discharge of the unsifted residue from the various screens can be readily obtained. In addition to vibrating these screens, or sieves, they are also jarred, the vibration effecting the sifting operation and the forward travel of the residue down the incline, while the jarring prevents the screen from becoming clogged because it dislodges any of the particles more or less securely caught in the holes or mesh of the screen, thereby maintaining the latter clean and unclogged at all times. Because of this jarring the capacity of the screen is maintained at a maximum and consequently for a given capacity machine a less amount of the expensive bolting cloth or silk is required.

In order that my invention may be fully understood I have illustrated a preferred and desirable embodiment of the same in the accompanying drawings which form a part of this specification and throughout the various views of which like reference characters refer to the same parts.

In these drawings Figure 1 is a plan view of such a machine. Fig. 2 is a side elevation of the same, certain parts being broken away to more clearly illustrate the relations of the inclined sieves or screens and the discharge chutes. Fig. 3 is an elevation of the end of the machine remote from the vibrating eccentric. Fig. 4 is a plan view of the distributing spout box. Fig. 5 is an enlarged fragmentary longitudinal section through a plurality of screens illustrating their relation one to the other, and Fig. 6 is a section through the driving shaft illustrating the vibrating eccentric.

The frame of the mechanism includes three upright posts 10, 11 and 12, on each side, the upper and intermediate longitudinal beams 13 and 14 on each side, and the transverse or end connecting beams 15 and 16, the parts being rigidly and fixedly held together by a plurality of longitudinal bolts 17 and 18 and cross bolts 19 and 20. As is clearly illustrated, the frame as so constructed is mounted on a pair of sills or bases 21 to which the various upright posts are securely bolted at 22.

On the bottom surfaces of each of the top beams 13 I rigidly secure by brackets 23 a pair of depending vibratory supporting wooden strips or pieces 24 which at their lower ends are fastened at 25 to the outer longitudinal side walls of a rectangular box or frame 26 open at top and bottom, the sides of such box or frame being connected together transversely by the strips 27. Such supporting means for the screen or sieve box 26 permits ready longitudinal vibration of the same and in order to effect such vibration I connect the front end of the box by a rod or bar 28 to an eccentric strap 29 encircling an eccentric 30 on the shaft 31 rotatable in suitable bearings 32, 32, and driven by means of a pulley 33 fixed to a protruding end of the same.

The sieve or screen box 26 at its other end has disposed transversely thereof a plurality of walls 34, 35, 36, 37, 38, 39 and 40 parallel to the end wall 41 of the box or frame 26 and forming with the latter and one another a plurality of discharge chutes 42, 43, 44, 45, 46, 47 and 48. As I have

clearly indicated in Fig. 2, these walls or partitions 34 to 40, inclusive, are of graduated height being deepest near the end of the box and gradually reduced in height therefrom. In this sieve box I use in the present instance seven superposed sieves or screens, characterized in the drawings 49, 50, 51, 52, 53, 54 and 55, such screens being of graduated length, the top one, characterized 49, being the longest while the bottom one 55 is the shortest. Each of these screens, as is perhaps more clearly shown in Fig. 5, is composed of a pair of parallel longitudinal strips 56 cross-connected at their ends by pieces 57 and cross-connected at their bottom edges by a plurality of strips 58, to the top surfaces of which the screen or bolting cloth or silk 59 is attached or secured and it should be understood that the mesh of these cloths varies in the screens, the top one being the coarsest while the bottom one is the finest, the intermediate ones being properly graduated with respect to their mesh openings. The bottom screen 55 rests upon a pair of inclined strips or tracks 60 secured to the lower portions of the inner faces of the box or frame side walls and the other screens are stacked in the box resting one on top of the other. The top screen 49 projects over the discharge chute 42, as indicated, and its end bar 58 may rest upon the partition wall 34 so that the sand which fails to pass through this top screen 49 on to the screens beneath the same travels gradually down its inclined cloth or silk and discharges over the edge of the end strip 58 into the chute or passage 42. The screen 49, as I have clearly shown in Fig. 5, is of slightly less length than the distance between the two end walls of the box leaving a slight gap or space 61 which permits the screen to have a longitudinal movement independent of the box itself. The next screen 50 is disposed between the partition wall 34 and the opposite wall of the box, the screen being somewhat shorter than this distance so as to provide a space 62 whereby the screen may be jolted or jarred independent of the movement of the vibratory box in which it is contained. It will be noted that the end bar 58 of this screen rests upon the partition wall 35 and the unsifted residue on its bolting cloth or silk will pass over such bar into the chute 43. The constructions and arrangements of all of the other screens are similar, as shown in Fig. 2, each being shorter than the one next above it, having a mesh slightly finer than the one above it and discharging its residue into a chute next to the one used in connection with the screen above it, all of such screens being loosely held in place so as to have a sliding movement in the vibratory box.

Beneath the discharge end of the screen box I fix a stationary distributing spout box 63 having the seven spouts 64, 65, 66, 67, 68, 69 and 70, each having the inclined walls, clearly indicated in Figs. 2, 3 and 4, and adapted for connection by separate tubes through the floor to suitable receptacles on the floor below for the reception of the bodies of sand or the like properly graded.

In order to direct the various bodies of sand to the proper spouts in the spout box 63 I provide in the chute 42 an inclined or deflecting wall 71 shown in Figs. 1 and 3. Chute 43 is similarly equipped with an inclined wall 72 to direct its contents to spout 65, the other chutes 44 to 47, inclusive, having similar walls 73, 74, 75 and 76 to direct the various bodies of sand to the corresponding spouts 66, 67, 68 and 69. Chute 48, however, has two positively inclined deflecting walls 77 and 78 to carry the sand to the central spout 70. In this way the various graded bodies of sand may be readily and easily conducted to independent and separate receptacles or containers.

The operation of the appliance is substantially as follows: The sand to be graded being fed to the upper right hand end of the top screen 49, as viewed in Fig. 2, by any suitable means as through a chute or tube 79, and, assuming that the shaft 31 is rapidly rotated by means of its pulley 33 and that the sieve box or frame 26 and contained sieves is rapidly vibrated longitudinally owing to the connection 28 between the box and eccentric, a portion of such sand will pass through the top sieve 49 to the next sieve 50 and a portion of such latter part will pass through the second sieve to the next, and so on, each sieve or screen, however, retaining a certain residue which was capable of passing through the sieve above it and incapable of passing through that particular sieve. Such residues, owing to the vibration of the sieve box and contained sieves, gradually travel down the inclined bolting or sieve cloths or silks of the various sieves, and are continuously discharged from the ends of the sieves into the various chutes by which it is conducted to proper containers. Owing to the rapid vibration of these sieves this sifting or grading operation is carried out expeditiously and owing, furthermore, to the fact that all of the sieves are loosely contained in the sieve box or frame and are free to travel slightly longitudinally of the latter the sieves in addition to being vibrated are also rapidly jarred or jolted. Such jarring accomplishes the dislodgment of any particles of sand which have become caught or entangled in the meshes of the various sieves causing the travel of such particles downwardly toward the proper chutes. In this way the screens or sieves are at all times maintained in open or unclogged condition so that a device of this character will possess

a maximum capacity for grading various materials.

To those skilled in this art it will be apparent that many minor mechanical changes may be made in the embodiment of the invention herein set forth without departure from the substance and essence of the invention and it will also be apparent that the invention is susceptible of a considerable number of embodiments each possessing the various features of advantage and benefit inherent in the invention. Consequently, I do not wish to be limited to the exact structural characteristics of the device which I have herein set forth merely as an example of one particular embodiment.

I claim:

1. In a device of the character described, the combination of a plurality of superposed screens resting directly one on top of the other, each screen being freely movable longitudinally to provide for a jarring action, means to vibrate said screens, whereby a shaking, in addition to a jarring, action is secured, and means to convey away separately the residues which fail to pass through the various screens, substantially as described.

2. In a device of the character described, the combination of a plurality of inclined screens of different mesh resting directly one on top of the other, each screen being freely movable longitudinally to provide for a jarring action, said screens being of graduated lengths with the longest screen uppermost, means to vibrate the said screens, whereby a shaking, in addition to a jarring, action is secured, and means for conveying away the residues which fail to pass through the various screens, substantially as described.

3. In a device of the character described, the combination of a frame, a plurality of superposed inclined screens of different mesh resting directly one on top of the other and loosely mounted in said frame, each of said screens being capable of an independent limited movement in the direction of their inclination to provide for a jarring action, means to vibrate said frame, whereby a shaking, in addition to the jarring, action is secured, and means to convey away separately the residues which fail to pass through the various screens, substantially as described.

Signed at Chicago in the county of Cook and State of Illinois this 30th day of November A. D. 1909.

CHARLES H. HERSEY.

Witnesses:
S. C. HAUGHEY,
H. BROEKER.