June 14, 1932. W. S. WESTON 1,863,291

TESTING SCREEN

Filed Nov. 3, 1928

FIG. 1.

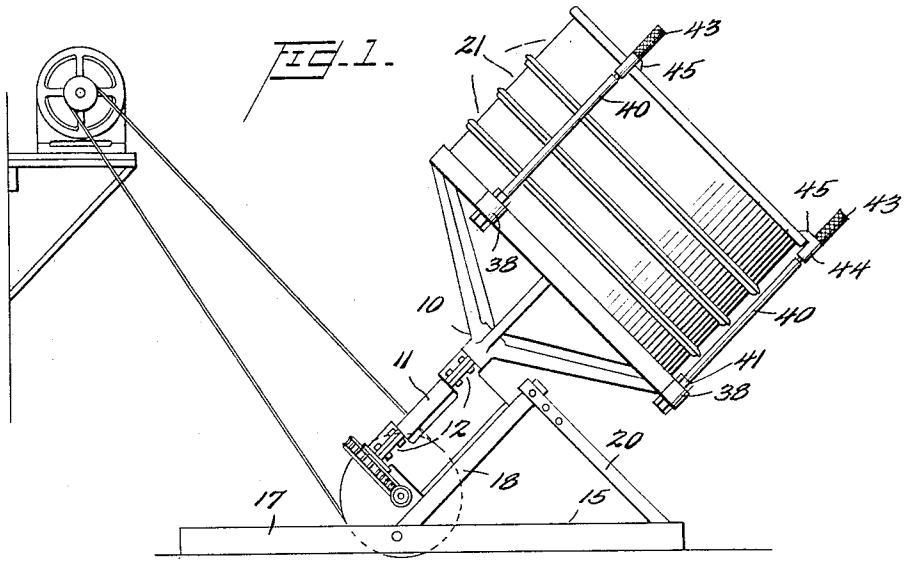


FIG. 2.

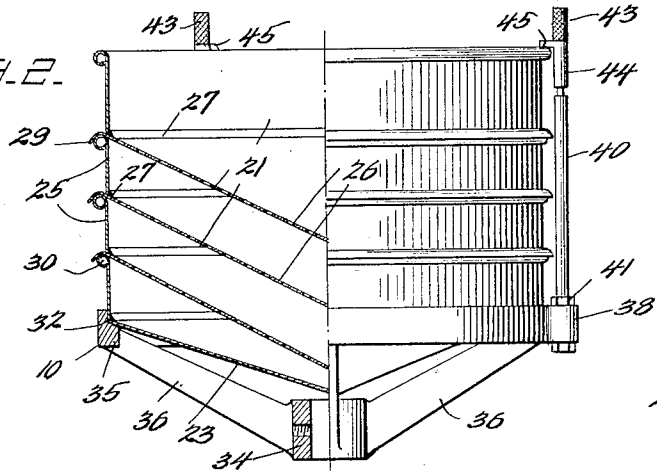


FIG. 4.

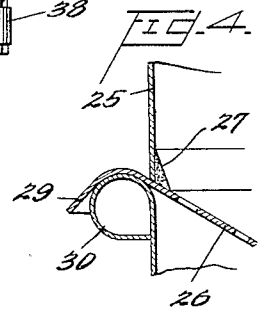
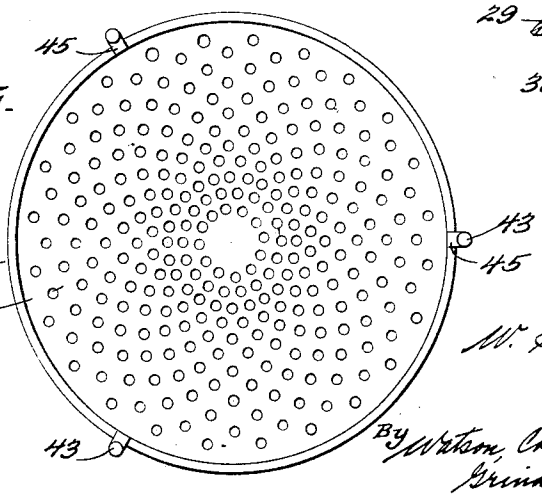


FIG. 3.



Inventor

W. S. Weston

By Watson, Cole, Morse & Grindle Attorney

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UNITED STATES PATENT OFFICE

WILLIAM STEVENSON WESTON, OF COLUMBIA, SOUTH CAROLINA

TESTING SCREEN

Application filed November 3, 1928. Serial No. 317,101.

This invention relates to improvements in apparatus for separating or dividing granular or nodular material such as sand, gravel or stone according to size, and is particularly concerned with that class of machine which is used for testing a given quantity of such material to determine the constituent amounts of material of various sizes.

It has heretofore been proposed to construct separating or testing devices which would impart bumping, shaking or other violent agitating movement to a sieve to cause the finer material supported thereon to pass through, the action being assisted in some instances by the simultaneous rotation of the screen. It is found, however, that devices operated in this manner are effective in separating the finer materials only, and are quite unsuitable for the handling of stone or gravel of larger size than ¼". Furthermore, the mechanism for imparting vibration to the screen is necessarily somewhat complicated and the sudden reversals of movement of the device soon result in loosening of the parts and consequent expense for repair and replacement.

It is therefore an object of the present invention to provide a device of this character which is simple and inexpensive to construct and operate, and which will treat efficiently both the fine and the coarser material ranging in size from less than ¼" to more than 2½".

It is a further object of the invention to provide a testing screen which will separate the material accurately and quickly regardless of the amount of moisture present therein, and in which the separated constituents are easily accessible for weighing and examination.

A further object is the construction of a screen which will segregate divided material of any size and which requires no motion other than that of uniform rotation about a substantially centrally disposed axis.

A still further object is the provision of a sieve which may be readily removed and replaced in the screen, and which is of simple and sturdy construction, and the provision of means for securely retaining any desired number of these sieves in operative position in the screen.

Further objects and features of the invention will be apparent from the following description thereof taken in connection with the accompanying drawing, in which:

Figure 1 is an elevation of a screen constructed according to my invention;

Figure 2 is a partial section of the sieves and sieve support taken on the line 2—2 of Fig. 1;

Figure 3 is a plan view of a sieve; and

Figure 4 is a vertical sectional view showing certain details.

In the embodiment of the invention disclosed herein for the purpose of illustration, a sieve support 10 is pinned or otherwise secured for rotation to a shaft 11 which is in turn mounted in suitable bearings 12. A base, indicated generally at 15, is provided for so supporting the bearings 12 that the shaft 11 is inclined at a substantial angle with the vertical, and this base preferably includes means for permitting adjustment of the shaft inclination. In the simple construction chosen to illustrate the invention, the base has been shown as comprising a platform 17, a plurality of inclined members 18, pivoted to the platform and serving to directly support the bearings 12, and a plurality of braces 20 having pivotal connection with the platform and with the members 18, provision being made for altering the points of pivotal connection to vary the inclination of the members 18. It will be understood, however, that this specific construction is not essential to the invention and may be modified as desired.

Seated on the sieve support, and concentrically disposed with relation to the shaft 11, are the sieves 21, and the pan 23. The sieves are preferably constructed in the manner disclosed in Fig. 2 of the drawing, each comprising a cylindrical portion 25, constituting a retaining wall, and a conical portion 26. Both portions may be readily formed of sheet material, preferably steel or brass, and may be conveniently secured together by electrical welding at 27. It will be noted that by reason of this construction it is unnecessary

to provide separate means for retaining the portion 26 in its conical shape, the welding operation serving this purpose as well as uniting the sieve portions. The conical portion of each sieve is provided with the usual perforations, the size of which determines the size of the material retained thereon, the smaller material passing through to the sieve below, and from the last sieve to the pan 23 which is constructed similarly to the sieves 21 with the exception that the conical portion thereof is not perforated, so that all material falling thereon is retained. An annular rolled or downturned lip 29 extends outwardly of the cylindrical portion of each sieve and rests on a correspondingly curved bead 30 formed on the upper edge of the cylindrical portion of the sieve directly below.

The lowest sieve rests on the pan 23, which is not provided with an annular lip, but which seats in an annular depression 32 in the sieve support 10. A convenient construction for this sieve support is illustrated in the drawing in which the support comprises a casting having a hub 34, and an annular rim 35 in which the depression 32 is formed, the rim and hub being connected by a plurality of spokes 36. A plurality of ears 38 are formed on the rim of the hub, these ears being apertured to receive means for retaining the sieves rigidly in position on the sieve support. The preferred construction of this means is disclosed in the drawing in which a rod 40, passing through the ears 38 and secured thereto by threaded means 41, extends in a direction parallel to the axis of the device to a point above the uppermost sieve. The rod 40 is threaded at its upper end to receive the threaded element 43. A member 44, slidable on the rod, is provided with a suitable lug 45 on one side thereof for engagement with the beaded rim of the uppermost sieve, and is forced downwardly on the rod by the element 43 to clamp the superimposed sieves securely together and to the sieve support.

While the angle of the axis of rotation of the sieves with respect to the vertical, and the angle of the conical sieve surface with respect to the said axis may be varied considerably, it has been found that the best results with a wide variation in the size of the nodules of material being treated are obtained by so constructing the device that these angular values are approximately 45 degrees and 60 degrees respectively. The exact angular position of the axis may be adjusted after the device has been assembled by means of the adjustable base 15. Such an angular relationship of the parts causes the elements of the conical surface to assume varying angles with the vertical ranging from 15 degrees to 105 degrees and results in continuous rolling movement of the divided particles, preventing their accumulation at any one part of the sieve.

The shaft 11 may be rotated in any convenient manner, but is preferably motor driven through the worm gearing 48 at a uniform speed. Since the rotating parts are concentric with the axis of rotation, there are no unbalances forces present to cause vibration. The operation of the device will be apparent from the above description. A load of material which is to be separated or sorted is placed in the uppermost sieve, and the shaft 11 is uniformly rotated. By reason of the improved construction of the screen, material of any degree of fineness or moisture content is rapidly sifted through the progressively smaller apertured sieves, the finer material being deposited in the lower sieves. The clamping devices are then easily removed, and the sieves lifted off for inspection. The construction of the component parts of the screen is extremely simple, the parts may be readily assembled, and the angular disposition of the sieve surfaces renders the mechanism particularly effective for handling stone and similar material of large size as well as the finer granular substances.

It will be understood that the invention has been described in detail for the purpose of illustrating on embodiment thereof, and is not restricted to the specific construction disclosed herein, but may be modified within the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A sieve for use in a testing screen comprising a cylindrical retaining wall, and a conical, perforated sifting portion, said conical portion being connected adjacent the base thereof to one end of the cylindrical portion and being provided with an annular rolled flange extending outwardly of the point of connection with the cylindrical portion and constituting a means of support for the sieve.

2. In a testing screen, the combination with a support, of a plurality of superimposed sieves thereon, each sieve comprising a cylindrical portion provided with an annular bead at one end thereof, and a conical perforated sifting portion connected adjacent the base thereof to one end of the cylindrical portion and having an annular flange thereon extending outwardly of the point of connection with the cylindrical portion and being rolled to conform to the shape of the said annular bead whereby one sieve may be firmly supported on another.

3. In a testing screen, the combination with a support, of a plurality of superimposed sieves thereon, each sieve comprising a cylindrical portion provided with an annular bead at one end thereof, and a conical perforated sifting portion connected adjacent the base thereof to one end of the cylindrical portion

and having an annular flange thereon extending outwardly of the point of connection with the cylindrical portion and being rolled to conform to the shape of the said annular bead whereby one sieve may be firmly supported on another, and means for clamping said sieves in superimposed position on said support with the rolled flange of one sieve in engagement with the annular bead on the next lower sieve.

4. A sieve for use in a testing screen comprising a cylindrical retaining wall, and a conical, perforated sifting portion, said sieve being provided with an annular rolled flange extending outwardly of the point of connection with the cylindrical portion and constituting a means of support for the sieve.

In testimony whereof I hereunto affix my signature.

WILLIAM S. WESTON.