This invention relates to a fluid-pervious strati- 
fying table for separating granular materials of 
different specific gravities. 

An object of the invention is to provide an im- 
proved device of the above mentioned general 
type for separating materials of different specific 
gravities in an efficient manner and particularly 
in the provision of a novel arrangement of parts 
in which very efficient means is provided for 
drawing off the high-gravity material while 
maintaining a bed of such material of substan- 
tially predetermined depth. 

Other objects of the invention will appear here- 
in after the novel features and combinations be- 
ing set forth in the appended claims. 

In the accompanying drawings, 

Fig. 1 is a side elevational view, more or less 
diagrammatic, which shows a fluid-pervious strati- 
fying table incorporating the features of my 
invention; and 

Fig. 2 is a transverse view thereof showing par- 
ticularly the bed of material in section. 

In the embodiment of my invention illustrated 
in the drawings I provide a base 10 which prefer- 
ably forms a main air or fluid chamber and de- 
rives air or fluid from a source which is illus- 
trated as a fan 11. A motor driven rotary valve 
12 is provided in the feed pipe leading from the 
fan 11 to the chamber 10 to provide a pulsating 
characteristic to the fluid flowing to the chamber 
10 and ultimately through the bed of material for 
stratifying. In some embodiments of my inven- 
tion the valve 12 will be eliminated, in which case 
the air or fluid flow through the bed will be sub-
stantially constant instead of pulsating. Fur-

thermore, in certain broader aspects of my inven-
tion the stratifying fluid may be a liquid such as 
water, in which case the chamber 10 will derive 
liquid under pressure from any desired source. 

In this instance the liquid may flow through a 
valve similar to valve 12 or not, depending upon 
whether or not it is desired to have it pulsating 
or non-pulsating in character as it flows upward-
ly through the bed of material. 

As illustrated diagrammatically in the draw-
ings the base 10 is provided with a pair of later-
ally spaced upwardly extending supports 13 on 
the tops of which there are rigidly attached I-
members 14 which act as rails to support and 
guide four rollers in the form of a pair of rear 
rollers 15 and a pair of front rollers 16 which are 
carried in appropriate brackets rigidly attached 
to the bottom member of a reciprocating deck 17. 

The deck 17 slopes generally from the feed end 
to the discharge end as clearly illustrated in Fig. 55.
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28. Each side of the plate or screen 26 formed from the longitudinal high point thereof to its lower edge lies in a single plane which is inclined laterally to the longitudinal axis of the deck 17.

The material to be cleaned such as fine raw or previously treated coal, is delivered to a feed hopper 27 at the upper end of the deck 17 and flows over the perforate plate or screen 26. As the material thus flows, it is subject to stratifying action, as hereinafter described more completely, and ultimately the clean coal is discharged over a discharge chute 28 and the refuse is collected in lateral troughs 29 there being one on each side of the deck 17, and discharged over refuse chutes 30.

If desired, troughs 29 may be subdivided to segregate a high-gravity and middling product. Where coal is the material being treated the clean coal is, of course, the low-gravity material and the refuse is the high-gravity material. If ore is being treated the high-gravity material is the concentrates or values while the low-gravity material is the refuse or gangue.

To provide for supplying a controllable amount of air or other fluid to each of the cells 23 and thus to control the amount of fluid which flows upwardly through each sectionalized portion of the perforate plate or screen 26 it is provide an individual conduit or pipe 31 between the chamber 10 and each cell 23. The central portion of this conduit or pipe 31 is preferably made of flexible tubing, as clearly illustrated in Fig. 3 of the drawings, and each pipe or conduit 31 is provided with an individually controllable or shut-off regulating valve 32 which can adjust the fluid flow to each cell 23. It is to be particularly noted that there is a partition 25 on each side of the deck 17 which is substantially directly below each screen 26, this is particularly desirable to the end that the amount of fluid which is directed upwardly through the bed of material which is outside each screen board 22 may be adjusted, as it is generally desirable to deliver fluid at a greater rate through this material than through other portions of the bed. In other words, the fluid flow through the material within the dam-and-seal draw is preferably greater than through the other portions of the bed.

In the operation of the device the material, which is made up of constituents of different specific gravities such as high-gravity refuse found in coal including shale and bone coal and low-gravity material such as pure coal particles, is fed by way of the feed hopper 27 onto the material supporting portion of the deck 17 represented by the perforate plate or screen 26.

The vibratory or reciprocatory motion imparted to the deck 17 in itself will tend to produce a certain amount of stratifying action and what is of considerable importance will impart at least to a considerable extent a fluid or mobile characteristic to the bed of materials. After the device has been in operation for a while, the bed of materials, under the combined action of the vibratory motion and the upward flow of fluid, whether it is constant or periodic, will tend to stratify with high-gravity material forming the lower stratum and the low-gravity material or coal forming the top stratum.

At the discharge end, the material will be banked against a banking board 33 which will act to prevent the refuse or high-gravity material from flowing into the discharge chute 28. The high-gravity refuse will form on the perforate plate or screen 26 along the general lines illustrated in Fig. 2 of the drawings and due to the extremely fluid characteristic of all the material forming the bed, which bed as a whole may be designated 34, it is evident that the material in each of the draws 21, 22 will be subject to what is similar or substantially equivalent to a hydraulic head produced by the bed of materials which is between the seal boards 22 and which has a greater height than the dam boards 21.

As a consequence, the dam-and-seal draws 21, 22 will act automatically and with a tendency of pro- cating or moving parts, relative to the deck 17, so as to maintain a substantially uniform depth of refuse bed assuming a substantially uniform depth of total bed 34. In other words, the damand-seal draws require no special moving parts with respect to the deck 17. However, due to the reciprocation of said deck 17 or more broadly stated due to the fluid characteristic of the bed 34, including particularly that portion which is in the dam-and-seal draws 21 and 22, said draws act automatically to discharge the refuse or high-gravity material at such a rate and in such a manner as to maintain a predetermined ratio between the depth of the refuse or high-gravity portion and the low-gravity or clean coal portion of the bed 34. In other words, the apparatus disclosed performs in an automatic or gravity-acting manner to separate materials, particularly fine materials, of different specific gravities and involves an improved mechanism and process for carrying this out.

From the foregoing it will be obvious that I have provided an improved stratifying table for separating granular materials of different specific gravities wherein materials to be separated are fed to a deck from which materials of high specific gravity are discharged at the sides and material of lowest specific gravity is discharged at a lower end over a banking board or dam. The deck includes a base which forms a plurality of open topped cells or chambers and a central top ridge which extends throughout the length of the base and over which there is a screen adapted to form a top for the base and to support materials fed to the deck. The deck is reciprocated lengthwise of its central ridge in a plane sloping from its feed end whereby material fed to the screen will be agitated and caused to flow downwardly thereover with the materials of greater specific gravity also flowing outwardly to each side of the central ridge to dam-and-seal draw structures one of which extends along each side of the base. Each of the dam-and-seal draw structures includes an upright seal board positioned inwardly of the edge of the screen and spaced above it under which high specific gravity material to be discharged from the deck must pass, an upright dam board positioned adjacent the edge of the screen over which high specific gravity material must spill to be discharged from the deck, and an outer trough for receiving material spilled over the dam board. Means is provided for creating a flow of fluid to each of the cells or chambers below the screen whereby the fluid, which may be either air or water having a constant or pulsating flow, is caused to flow upwardly through the stratification of the materials thereabove and to flow with a greater velocity than the average of the velocities of flowing fluid in the other cells or chambers upwardly from cells or chambers positioned below the screen and between the dams and seals for assisting in lifting the high specific gravity material to be discharged from the deck over the dams.
Obviously those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the claim hereto appended and I wish therefore not to be restricted to the precise construction herein disclosed.

Having thus described and shown an embodiment of my invention, what I desire to secure by Letters Patent of the United States is:

A stratifying table for separating granular materials of different specific gravities having a deck including a base, said base having a central top ridge extending throughout its length and being formed to include a plurality of open topped cells, screen means above and forming a top for said base adapted to carry a bed of material, a dam-and-seal draw structure extending along each side of said base including an upwardly extending dam means positioned adjacent the edge of said screen and seal means positioned above said screen and inwardly of said dam means, said base including cells positioned between said dam-and-seal means, trough means extending along the outside of said dam means adapted to catch material spilled over said dam, means movably supporting said deck in an inclined plane with respect to its length, means for reciprocating said deck lengthwise of said central top ridge for agitating material above said screen means, means for causing a current of fluid to flow upwardly through said screen means, said last named means including means for creating fluid flow, and means for conveying flowing fluid to each of said cells and through said screen in such manner that the velocity of fluid flowing through said cells positioned between said dam and seal means is greater than the average velocity of the fluid flowing through said other cells whereby material fed to the high end of the deck is caused to flow downwardly thereover, the material of greater specific gravity moving sidewardly from each side of the ridge in said deck, under the seal means and over the dams to spill into the troughs, the greater velocity of the fluid adjacent the dams assisting in lifting the material of greater specific gravity thereover.

BYRON M. BIRD.

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