

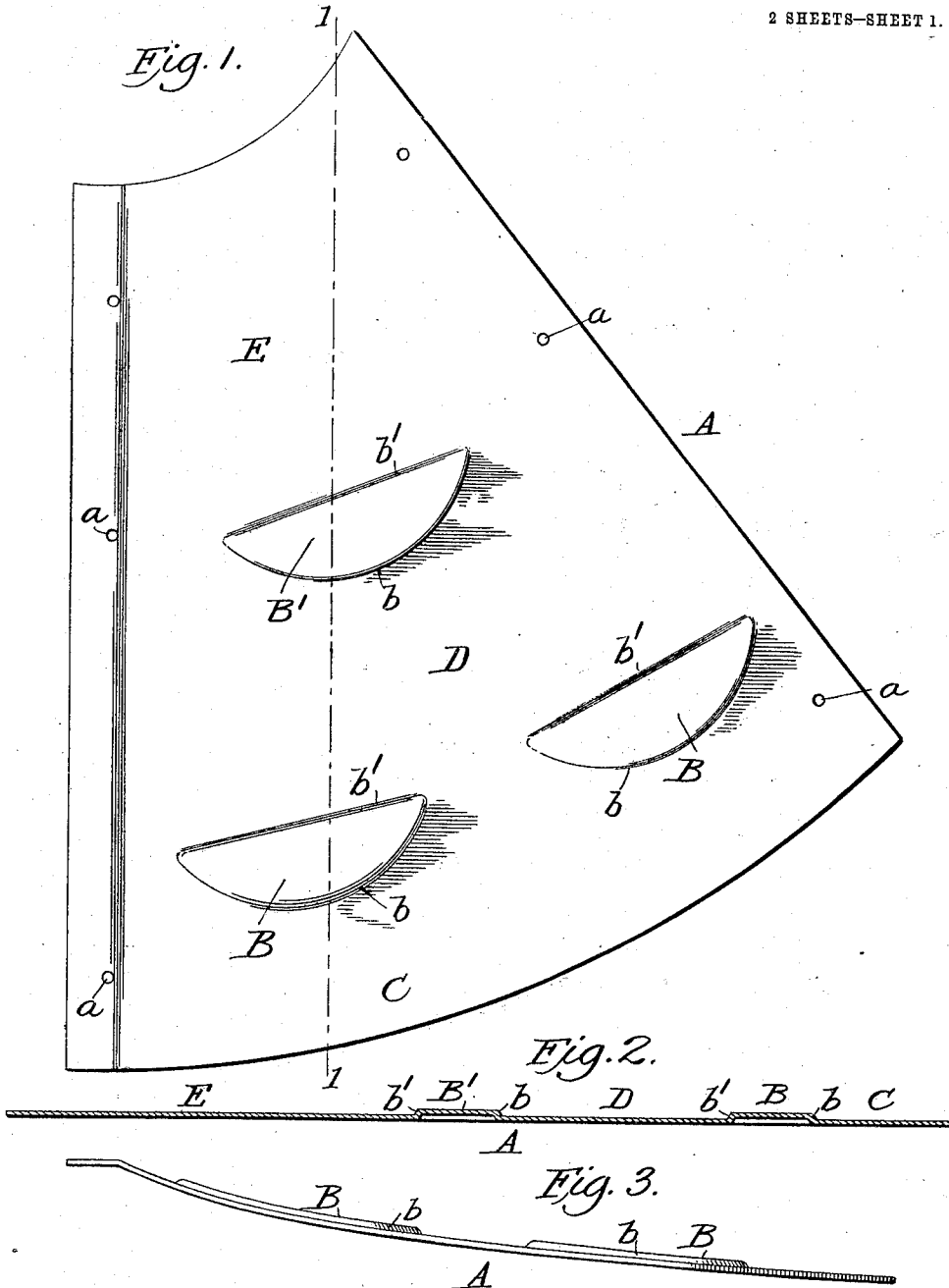
F. PARDEE.
 PLATE FOR SPIRAL SEPARATORS.
 APPLICATION FILED APR. 11, 1910.

977,035.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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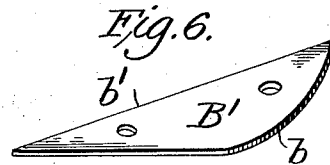
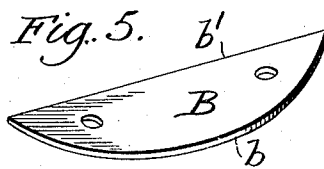
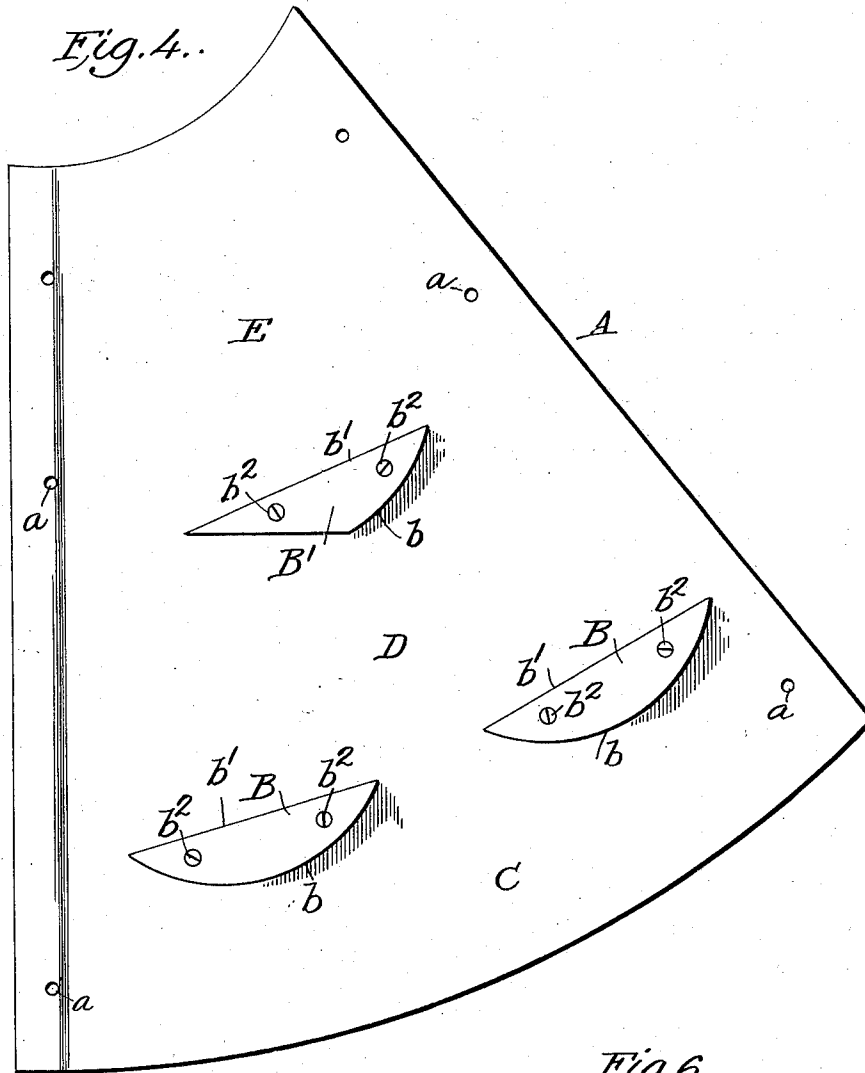
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977,035.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 2.



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PLATE FOR SPIRAL SEPARATORS.

977,035.

Specification of Letters Patent.

Patented Nov. 29, 1910.

Application filed April 11, 1910. Serial No. 554,872.

To all whom it may concern:

Be it known that I, FRANK PARDEE, a citizen of the United States, residing in Hazleton, county of Luzerne, and State of Pennsylvania, have invented certain new and useful Improvements in Plates for Spiral Separators, of which the following is a specification, reference being had to the accompanying drawings.

The improvement, or invention, has relation to spiral separators used chiefly in removing slate and "bone" from coal. The class or type of separator to which the invention refers, is shown and described in certain patents issued to me on July 25th, 1899, some of which show a variety of irregular deviated retarding surfaces, but much fewer than the number of forms which have since been made and used, or experimented with by me, at various times. In Patent No. 629,592, of July 25th, 1899, it was stated that the form of the irregular surfaces or surfaces deviating from the plane of the floor, was practically immaterial, which was correct for the irregular surfaces therein shown and for the broad scope of the claims of that patent, in view of the state of the art as it then stood. But it was not then known, nor does it appear from the patents mentioned, that the form, adaptation and arrangement or spacing of retarding surfaces on plates or jackets for spiral separators, may be made to materially affect the length of run required for the materials to properly separate from one another, nor was it then or hitherto known, what forms of retarding surfaces, and their equivalents, are capable of producing a separation of the mixed substances by a shorter run over fewer plates than have ordinarily been used in spirals of the class stated.

The chief objects of the present invention are to improve spiral plates or jackets, by retarding surfaces adapted and disposed to insure a more effective action for causing the slate to take the inside course, the "bone" a middle course, and the coal the outside course, by a shorter run than heretofore.

The invention consists of a spiral separator plate, having an inward and downward pitch, as in older forms, but provided with retarding surfaces disposed at intervals, so as to leave intervening helical and tangential free spaces to be traversed by different

materials, the outer contour of the retarding surfaces being such as to turn and guide "bone" and slate, on the outside of them, helically, or inwardly, while the coal passes freely on to a coal run as hereinafter more fully described and pointed out or indicated in and by the claims.

In the drawings, Figures 1 to 3, show retarding surfaces integral with the plate. Fig. 1, is a plan view of a plate intended for use in a left-hand spiral, and shows retarding surfaces having a suitable outer contour, and disposed at intervals so as to leave intervening spaces for tangential, helical and inward movements of different materials. Fig. 3, is a peripheral edge view of the same, and Fig. 2, a section taken on the line 1, 1, of Fig. 1. Fig. 4, is a plan view of a plate having different forms of inner and outer retarding surfaces separately made and secured to it by screws. Figs. 5 and 6 are perspective views of the same retarding surfaces detached from the plates.

The plate or jacket A, is of any pattern adapted to form an element of a spiral, or of a feed-plate for spirals. As shown it belongs to the spiral proper, and is provided with holes *a*, for receiving bolts by which it can be secured to supporting rods, not shown. The supporting rods usually enter a central post, not shown, on an upward flare such as will give to the plates an inward inclination suited to the size of the spiral. Ordinarily the bolts or screws by which the plates are secured to the supporting rods pass through the lower edge of one plate and the upper edge of the next lower plate, so that the lower edge of the several plates overlaps the upper edge of the plate below.

The retarding surfaces B, and B¹, preferably have their outer side or contour *b*, curved, while the inner edge or contour *b*¹, may be straight as shown, or of other suitable conformations. In Figs. 1 to 3, the retarding surfaces appear as stamped integral with the plate, and raised above the adjacent parts of the plate to about the thickness of the material. The retarding surfaces are also shown as having the same inward pitch or axial incline on radial lines, as other parts of the plate, but they need not be so made; they may have a different inward pitch or form plane horizontal surfaces.

The three retarding surfaces shown on Figs. 1 and 4 are disposed on the plate so that the two upper or outer ones B, are the same in distance from the periphery of the plate, between which and these surfaces the space C, on the plate, forms a coal-run or leap for the coal from the slate-thread to a separate coal-thread. The lower or inner retarding surface B¹ is located so as to form a radial impediment to the free space between the near ends of the outer and upper surfaces B, B, but tangentially there is no such impediment on the surface of the plate. The surface B¹, is intended as the inner boundary of the bone-run D, and the outer boundary of the slate-run E.

The intervening free spaces permit the materials to pass tangentially, helically, or inwardly. The tangential movement is needed for coal and also for "bone" which may be too far in and an inward movement is needed for "bone" and for slate which may get too far out on the plate, while all materials should move helically, on their respective runways, before passing from the spiral.

If slate, or "bone", passes beyond its proper runway the outer contour of the retarding surfaces with which either of them may come in contact, acts along with gravity and frictional resistance, to guide and keep such pieces moving helically, or inwardly, assuming centrifugal force to have been sufficiently overcome to permit a turning movement.

In Figs. 4, and 5, the retarding surfaces B, B¹, are shown as being formed separately and secured to the plate by countersunk screws b². In thus making these parts, they may be given any thickness and form of top surface for contact with materials, as may be deemed best; and they may also have any rounding, beveling, or steepness of the inner and outer parts, of the perimeter desired for the purpose of retardation, or for changing the course of the heavier materials or for their guidance, helically or inwardly. The outer contour b, of the retarding surfaces B, B¹, may be curved as shown in Figs. 1, to 3, or have an angle formation in part and a curved formation in part as shown by Figs. 4 and 6. And the outer contour or outer part of the perimeter of any of the retarding surfaces, whether integral or separately formed, may be sides of an angle so disposed as to aid in changing the course of, or for guiding the materials which have lost a part of their centrifugal force and are acted on by gravity with superior power. In such case the movements will be continued helically downward, or inwardly downward and helically along the proper runway, un-

less the course be again changed to the tangential by an excessive development of centrifugal force or power which is not likely to occur.

The curved outer contour b of the retarding surfaces, seems best adapted to a performance of the required functions, but the form is susceptible of changes within reasonable limits, especially by the substitution of angles for curves. The raised form of retarding surface is shown in the drawings, but a depressed surface may be used, or a combination of raised and depressed surfaces may be desirable, inasmuch as materials coming from different mines differ in specific gravity and frictional resistance, and also in their condition as to being wet or dry, special spirals being sometimes needed and ordered for particular collieries.

The size and number of retarding surfaces on a plate and their location is to be determined with regard to the intervening free spaces for tangential and helical movement of such materials as should properly take those courses and also with regard to the inward movements of materials which may get too far out on the spiral.

I do not herein specifically claim an outer contour formation of the retarding surfaces which adapts them to have an edge frictional contact with the heavier materials, though they may have that feature which is more clearly shown, described and claimed in another application executed by me on even date herewith, and filed as Serial No. 554872.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A spiral separator plate having an inward and downward pitch, and provided with retarding surfaces disposed at intervals, leaving intervening helical spaces approximately defining the runways for the different materials, the outer edge of said retarding surfaces being adapted to guide and draw the heavier materials, on the outer side thereof helically and inwardly.

2. A spiral separator plate having an inward and downward pitch, and provided with retarding surfaces disposed at intervals, leaving intervening spaces approximately defining the runways for the different materials, the outer edge of said retarding surfaces being curved and adapted to guide and draw the heavier materials, on the outer side thereof, helically and inwardly.

FRANK PARDEE.

Witnesses:

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LILLIAN SAUNDERS.