

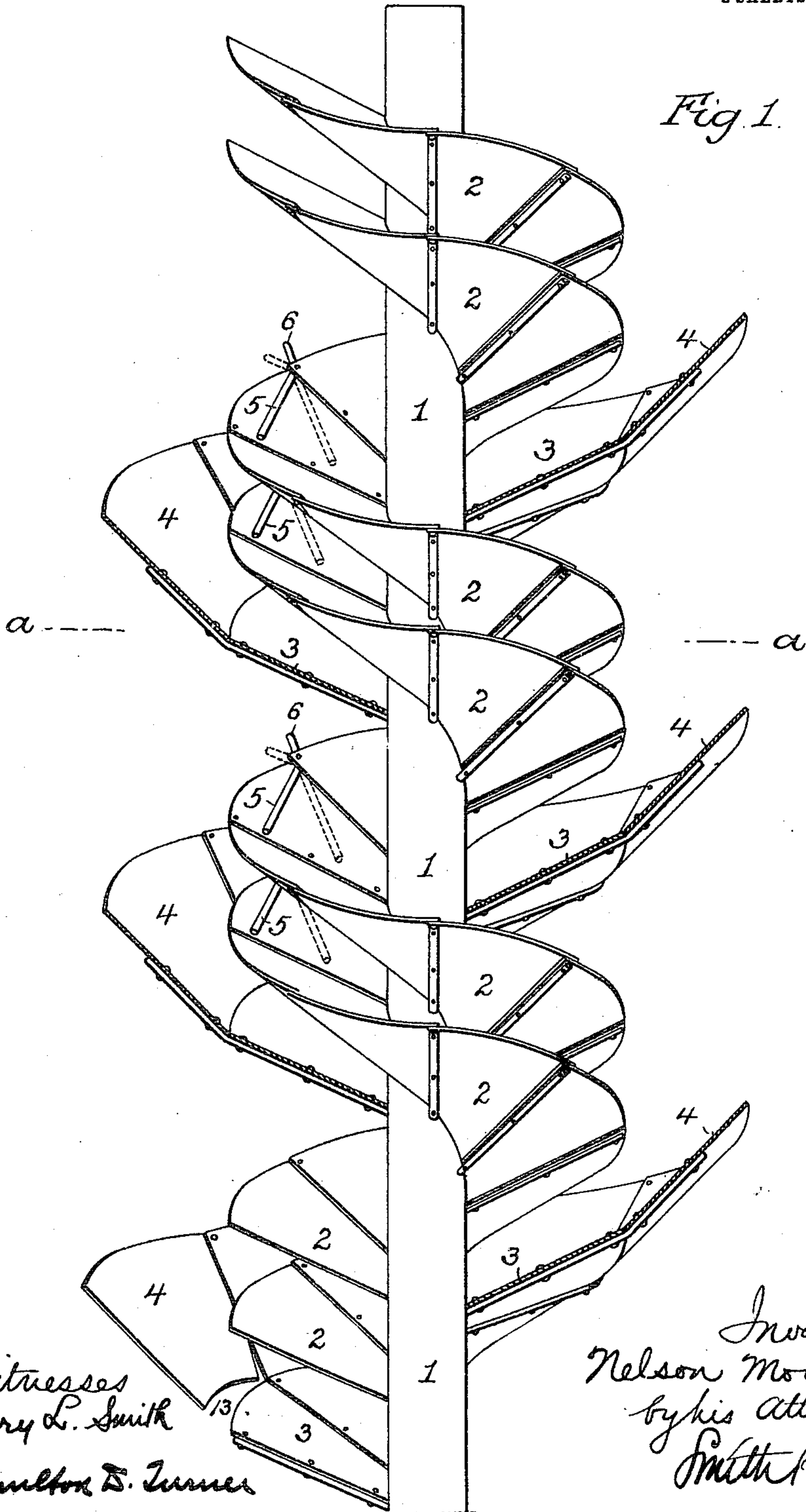
N. MOWERY.
CENTRIFUGAL COAL SEPARATOR.
APPLICATION FILED JULY 15, 1909.

964,444.

Patented July 12, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Harry L. Smith
Hamilton D. Turner

Inventor
Nelson Mowery
by his Attorneys
Smith & Poyer

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2 SHEETS—SHEET 2.

Fig. 2.

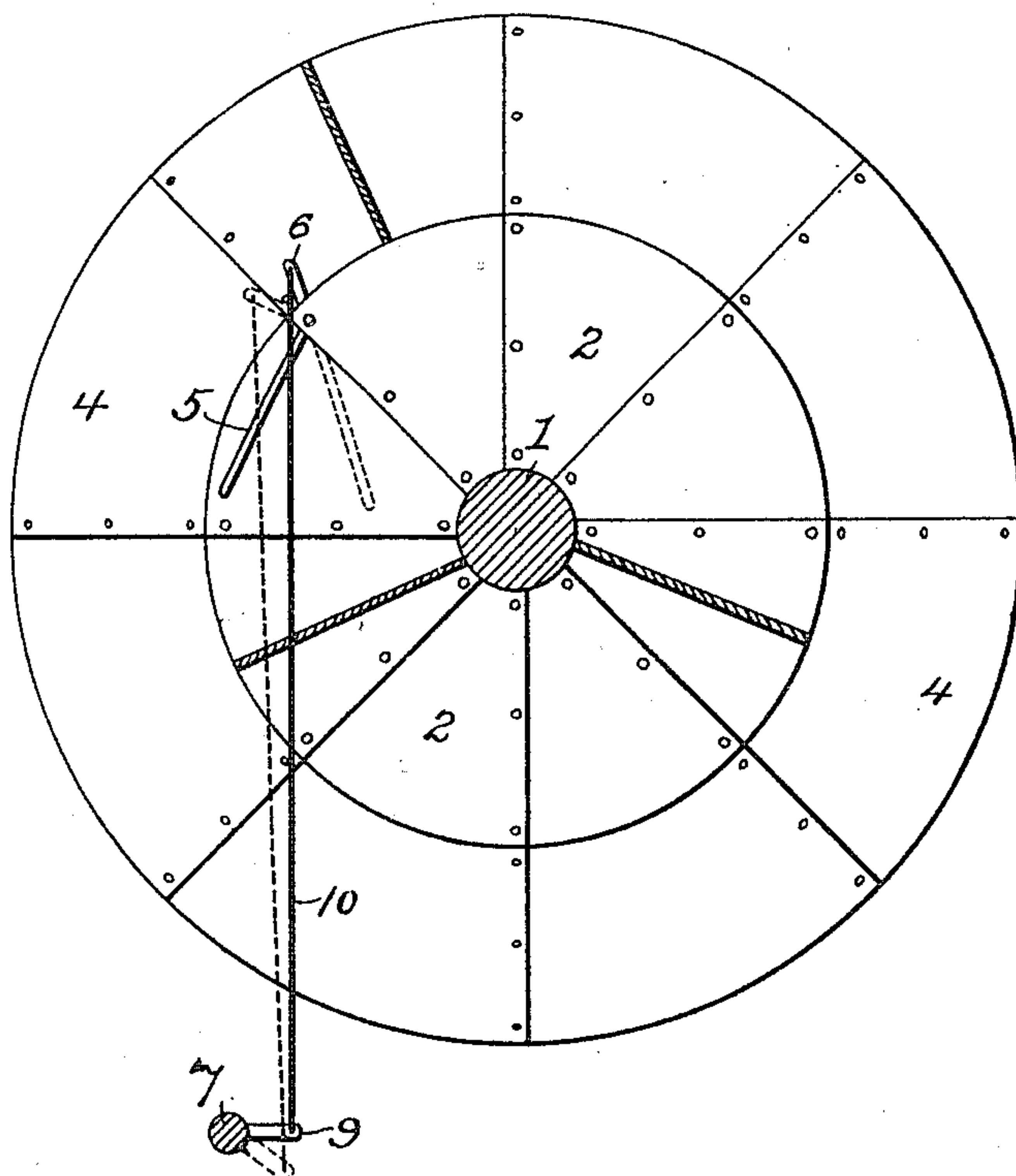
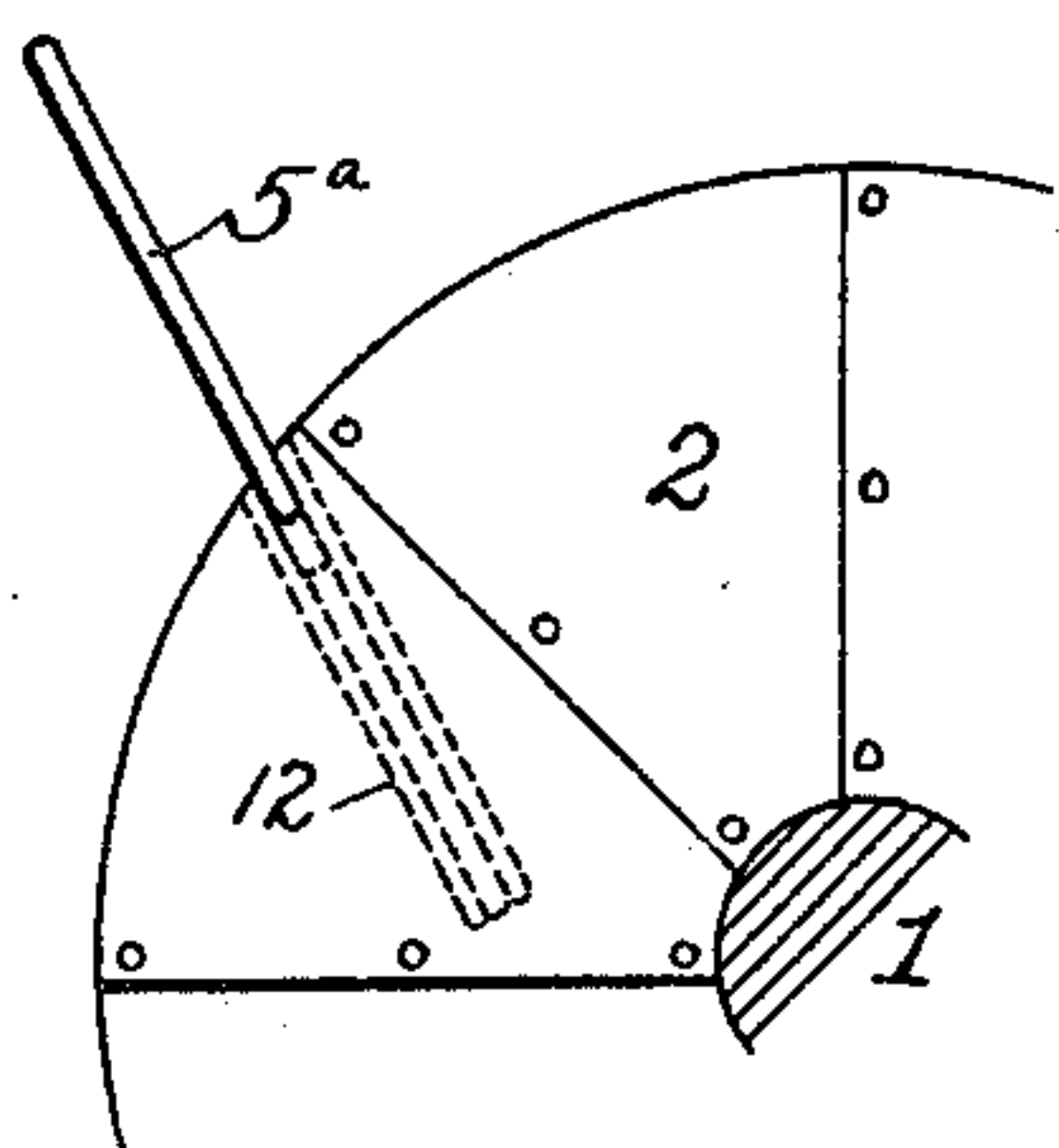
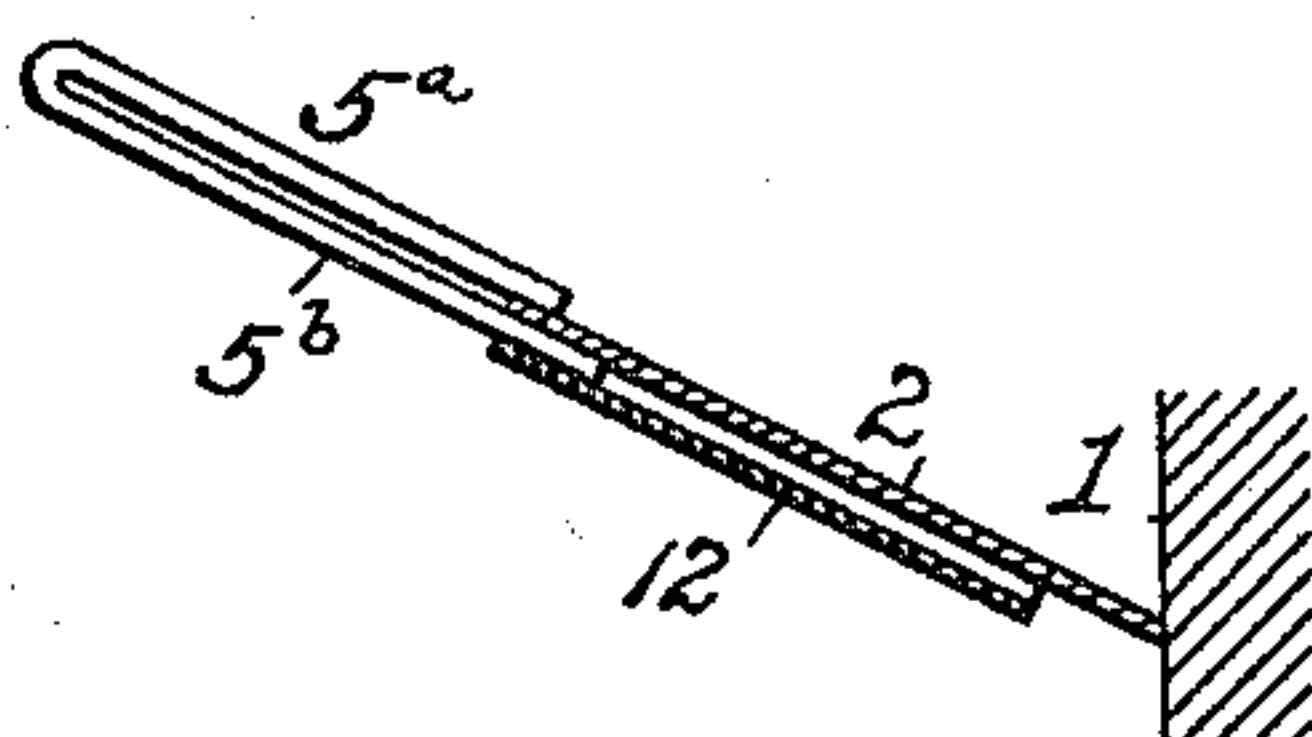


Fig. 3.



Witnesses
Harry L. Smith
Hamilton D. Turner

Fig. 4.



Inventor
Nelson Mowery
by his attorneys
Smith & Mayes

UNITED STATES PATENT OFFICE.

NELSON MOWERY, OF WILKES-BARRE, PENNSYLVANIA.

CENTRIFUGAL COAL-SEPARATOR.

964,444.

Specification of Letters Patent.

Patented July 12, 1910.

Application filed July 15, 1909. Serial No. 507,780.

To all whom it may concern:

Be it known that I, NELSON MOWERY, a citizen of the United States, residing in Wilkes-Barre, Pennsylvania, have invented certain Improvements in Centrifugal Coal-Separators, of which the following is a specification.

My invention consists of certain improvements in that type of centrifugal coal separator known as the "Pardee" spiral separator, the object of my invention being to readily adapt the separator for action upon different grades of coal, that is to say, coal mixed with different proportional quantities of slate or "bone". This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a view, partly in side elevation and partly in section, of sufficient of a coal separator of the type to which my invention relates to convey a proper understanding of my invention; Fig. 2 is a horizontal section on the line *a-a*, Fig. 1; Fig. 3 is a horizontal section illustrating a modification of my invention, and Fig. 4 is a transverse section of the latter.

That type of separator to which my invention relates consists of a central post 1, around which is coiled a series of helical shelves 2, or as they are usually termed "jackets", these jackets being usually built up of overlapping plates or leaves secured together where they overlap and properly supported upon the central post, so that they are inclined in respect to the horizontal, and pitch downwardly from their outer edges toward the post. These jackets are usually employed in series of two or more, the drawing illustrating a series comprising two jackets, and the coal mixed with slate or bone is fed onto the upper end of each jacket, and as it flows downwardly along the same the coal is separated from the slate or bone by centrifugal action, for the jackets are composed of sheet metal or other material which has a greater retarding effect upon the pieces of slate or bone than upon the pieces of coal, said pieces of slate or bone being usually flat or flattened, so that their progress downwardly along the jackets is a sliding progress, whereas the coal presents less contact surface and, its progress being less impeded by its friction

against the jackets than is the case with the sliding pieces of slate or bone, the centrifugal action has the effect of causing the coal to be thrown outwardly from the jackets, so that it may be caught upon a coal jacket, which consists of a helically coiled strip or shelf 3 disposed between the convolutions of the pairs or groups of slate jackets, such coal jackets being usually provided with outer flanges 4, disposed at a more obtuse angle in respect to the horizontal than is the jacket 3, the purpose of this flange being to insure the delivery to the coal jacket of all the particles of coal which are thrown out from the slate jackets.

In starting the operation the angle of the slate jackets is such as to properly act upon the grade of coal which is being submitted to the action of the separator, but it frequently happens, in changing to another grade of coal, that the slate and bone are not subjected to the same degree of retarding action by the slate jackets and pieces of slate and bone are discharged from the latter along with the coal.

Heretofore attempts have been made to overcome this objection by blocking up the plates or leaves of which the slate jackets are composed, but this is a tedious, time-consuming and not always effective method which my invention is intended to overcome.

In my improved separator each of the slate jackets has pivoted to it at or near its outer edge one or more bars 5, which bars are susceptible of adjustment so as to change the angle of their obliquity in respect to the direction of flow of the material over the jacket and cause them to project inwardly over the face of the slate jacket to a greater or less extent and thus deflect toward the central post the mass of material which is flowing over the slate jacket. These bars will be located at such points upon the helically coiled slate jackets as circumstances may prove to be necessary in order to enable a slate jacket of fixed inclination to properly separate all grades of coal. The first bar 5 will be located at such a distance from the upper or receiving end of each slate jacket that, even with those grades of coal in which the slate or bone is subjected to the least retarding action, said slate and bone in flowing downwardly from the receiving end of the jacket to said de-

flecting bar will not have acquired sufficient speed of movement to cause centrifugal force to discharge particles of slate and bone over the edge of the slate jacket along with the coal.

When the mass reaches the first deflector bar its speed of movement is checked and it is directed inwardly toward the post 1, so that it is, in a measure, compelled to take a fresh start, and before it has again gathered sufficient speed to cause discharge of the slate or bone with the coal it again meets a deflector bar and is again checked and directed inwardly toward the central post, and these operations are repeated as many times as necessary with the particular grade of coal which is being acted upon, or, in some cases, only one deflection may be necessary.

The deflector bars 5 may be adjusted by the application of direct force thereto, the pivotal connection being so stiff that the bar is not likely to be moved from its adjusted position by the pressure of the forwardly moving mass upon it. I prefer, however, to provide each deflector bar 5 with an arm 6 secured to or forming part thereof, and the arms 6 of a series of bars may be connected to a single operating device, such for instance as a vertical rock shaft 7 located adjacent to the separator and having any desired number of arms 9, each connected by a rod 10 to the arm 6 of its respective deflector bar.

A convenient means of pivoting the deflector bars is to dispose them between the overlapping portions of adjacent plates or leaves which constitute the slate jacket, and to mount them upon the outermost pin, bolt or rivet 11, whereby these overlapping portions of the plates or leaves are secured together, as shown in Figs. 1 and 2, but other means of mounting the deflector bars may be adopted if desired, or, instead of being pivoted, the deflector bars may be otherwise mounted upon the slate jackets so as to be adjustable thereon or removable therefrom or applicable thereto for the purpose of checking the speed of movement of the mass of material traveling forwardly over the jacket and deflecting the said material toward the central pole or post. One such means is illustrated in Figs 3 and 4, and comprises a sliding deflector bar of U-shape having an upper member 5^a overlapping the upper surface of the slate jacket and a lower member 5^b which is free to slide in a guide 12 properly disposed on the underside of the slate jacket, as shown in Fig. 4. In any case the position to which the deflector bar is adjusted and the extent of deflection of the mass which is traveling forwardly over the slate jacket may be determined by the character or grade of the coal under treatment, as some grades may necessitate a

greater degree of deflection than others, although my invention in its broader embodiments contemplates the use of fixed deflectors as well as adjustable ones, and the deflector may be such as to act only upon the sliding or relatively slow moving pieces of slate and bone and not upon the pieces of coal, or upon the former with a greater deflecting action than upon the latter.

The coal which has been separated from the slate and bone by the action of the separator travels downwardly along the helically coiled coal jacket 3 and is finally discharged therefrom into a coal-receiving chute separate from the chute or chutes which receive the slate and bone delivered from the lower ends of the slate jackets.

In the operation of a centrifugal coal separator of the type which I have illustrated it is quite likely that pieces of impure coal having a percentage of slate or bone combined therewith will be discharged from the slate jackets onto the coal jacket along with the pure coal, and in order to effect the separation of these pieces of pure and impure coal I find it advisable to provide at and near the delivery end of the coal jacket a gap between the jacket 3 and its flange 4. The pure coal which may be traversing the coal jacket, being more readily influenced by centrifugal force than the coal which is mixed with impurities such as slate or bone, will be projected through this gap into a suitable chute or receptacle while the pieces of impure coal, being less influenced by centrifugal force, will not reach the gap but will be delivered from the end of the coal jacket into a chute or receptacle separate from that which receives the pure coal.

One means of forming the gap between the coal jacket and the flange is to so mount one or more of the leaves or plates of which the flange is composed that said leaf or leaves can be separated from the coal jacket at and near the delivery end of the same, for instance, the plates or leaves of the flange may be connected together only at their outer edges, as shown in Fig. 1, so that either plate may be swung upon this connection as a pivot in order to provide the gap between its inner edge and the outer edge of the corresponding blade or plate of the coal flange, or the flange 4 may be discontinued altogether, at and near the delivery end of the coal jacket.

I claim:

1. The combination of the slate jacket of a centrifugal coal separator with an obstruction on the upper face of said jacket disposed obliquely in respect to the direction of flow of the pieces of slate and bone in their forward travel over the jacket, whereby their speed of movement is checked and they are deflected toward the center of the

separator, said deflector being combined with means whereby the angle of its obliquity can be changed.

2. The combination of the slate jacket of a centrifugal coal separator with an obstruction on the upper face of said jacket disposed obliquely in respect to the direction of flow of the pieces of slate and bone in their forward travel over the jacket, whereby their speed of movement is checked and they are deflected toward the center of the separator, said deflector being combined with means for varying the extent of its projection inwardly from the outer edge of the jacket.

3. The combination of the slate jacket of a centrifugal coal separator with an obstruction on the upper face of said jacket disposed obliquely in respect to the direction of flow of the pieces of slate and bone in their forward travel over the jacket, whereby their speed of movement is checked and they are deflected toward the center of the separator, said deflector being combined with means for changing the angle of its obliquity and for varying the extent of its projection inwardly from the outer edge of the jacket.

4. The combination of the slate jacket of a centrifugal coal separator with a deflector on the upper face of the jacket, said deflector being adjustably mounted whereby it can be caused to project to a greater or less extent inwardly from the outer edge of the jacket.

5. The combination of the slate jacket of a centrifugal coal separator with a deflector on the upper face of the jacket, said deflector being pivotally mounted and adjustable so as to be caused to project to a greater or less extent inwardly from the outer edge of the jacket.

6. The combination of the slate jacket of a centrifugal coal separator with obstructions on the upper face of the jacket disposed at intervals throughout the extent of the same, said obstructions being disposed diagonally in respect to the radial line of the jacket so as to change the line of flow of the material and direct it toward the center of the jacket, and means common to all of said obstructions for simultaneously changing their angular position in respect to the radial line of the jacket.

7. The combination of the slate jacket of a centrifugal coal separator with obstructions on the upper face of the jacket dis-

posed at intervals throughout the extent of the same, said obstructions projecting inwardly from the periphery of the jacket so as to change the line of flow of the material and direct it toward the center of the jacket, and means common to all of said obstructions for simultaneously changing the extent of their projection inwardly from the periphery.

8. The combination of the slate jacket of a centrifugal coal separator with a series of deflectors disposed on the upper face of said slate jacket and pivoted thereto so that they can be swung to a greater or less extent and to a greater or less angle across the normal line of flow of the material over the jacket, arms on said deflectors, a vertical rock shaft at one side of the separator, arms on said rock shaft, and connections between said arms and the arms on the deflectors.

9. The combination of the slate jacket of a centrifugal coal separator, said jacket being composed of overlapping blades or plates with a deflector bar pivotally mounted between the overlapping edges of adjoining blades or plates.

10. A centrifugal coal separator having a slate jacket and, outside of the same, a coal jacket for receiving the coal discharged by centrifugal force over the periphery of the slate jacket, said outer coal jacket having, at its delivery end, a tangential outlet for the discharge of the coal from its outer portion and a radial outlet for the discharge from its inner portion of coal which has not gained the outer portion of the jacket.

11. The combination, in a centrifugal coal separator, of the coal jacket and its outer flange, separated from each other at and near the delivery end of the jacket to form a gap through which coal can be discharged radially.

12. The combination, in a centrifugal coal separator, of the coal jacket and its outer flange composed of overlapping leaves or plates so connected that one or more of the leaves at the delivery end of the jacket may be separated from the latter to provide a gap between the two through which coal can be discharged radially.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

NELSON MOWERY.

Witnesses:

W. C. GREGORY,
WALTER NICHODSEN.