

J. M. DRAPER & C. HAMILTON.
 COAL AND ORE WASHER OR SEPARATOR.
 APPLICATION FILED AUG. 19, 1910.

998,606.

Patented July 25, 1911.

3 SHEETS—SHEET 1.

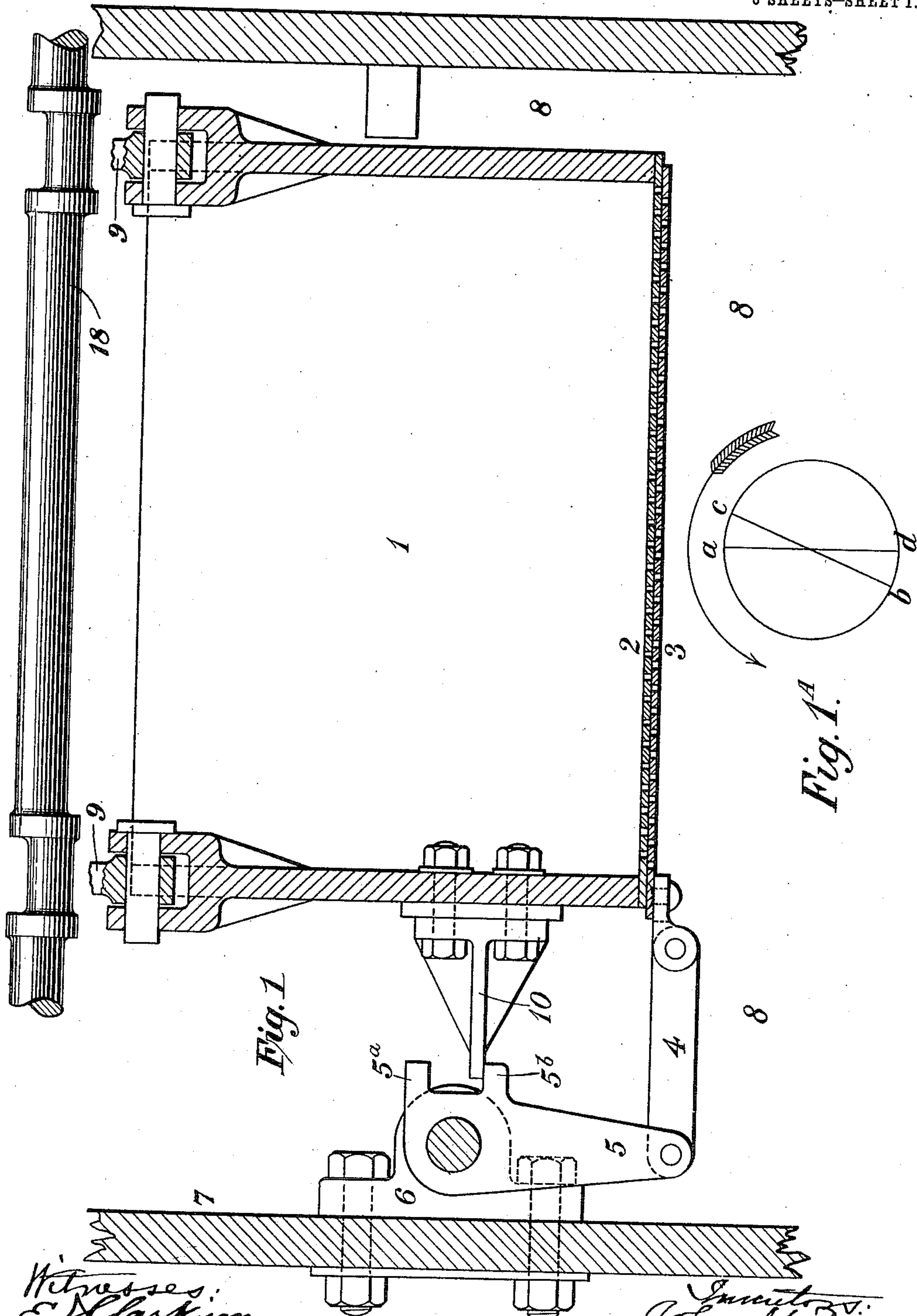


Fig. 1

Fig. 1A

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 Harry L. P. Burbo.

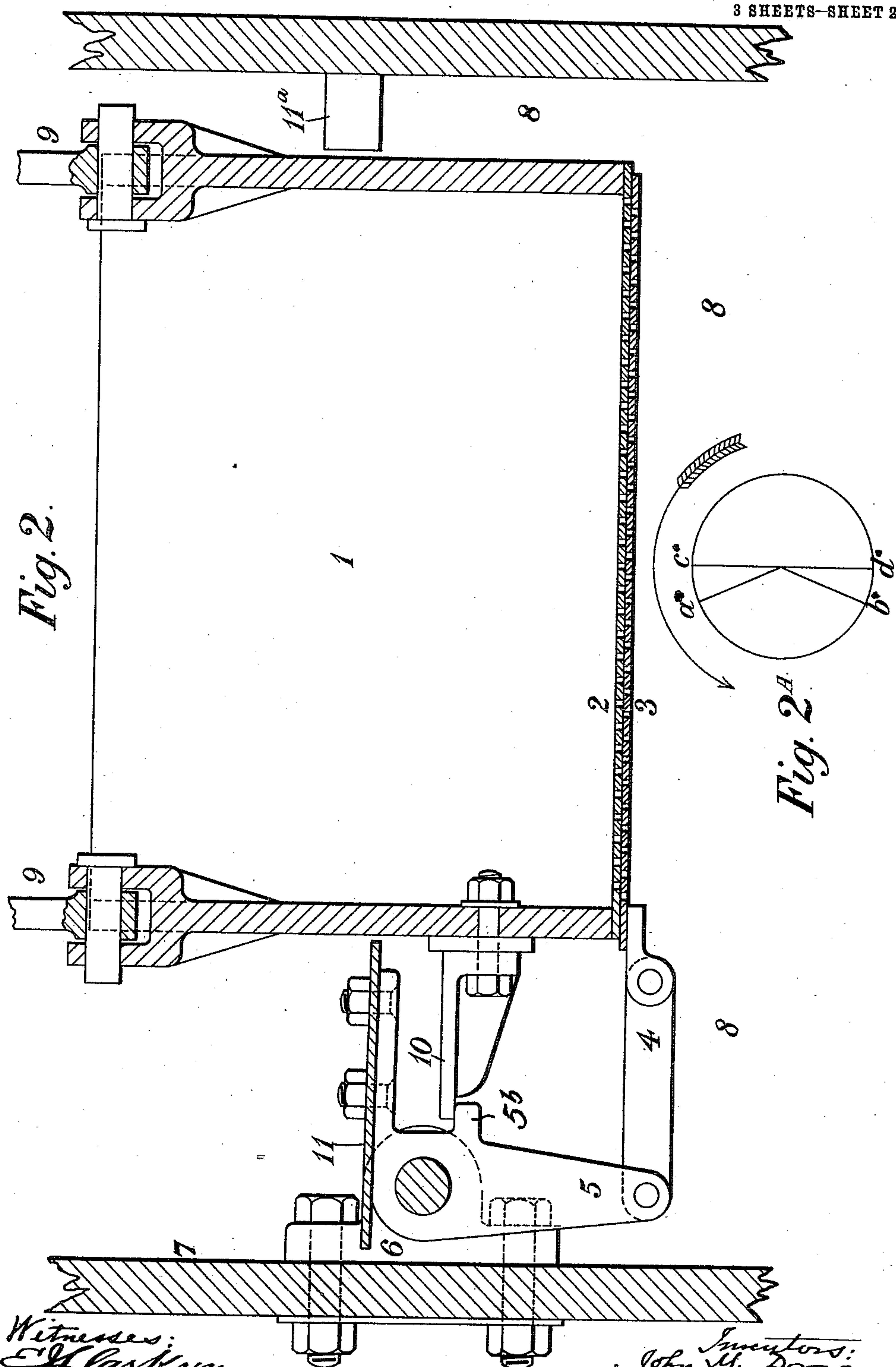
Inventors:
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3 SHEETS-SHEET 2.



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3 SHEETS--SHEET 3.

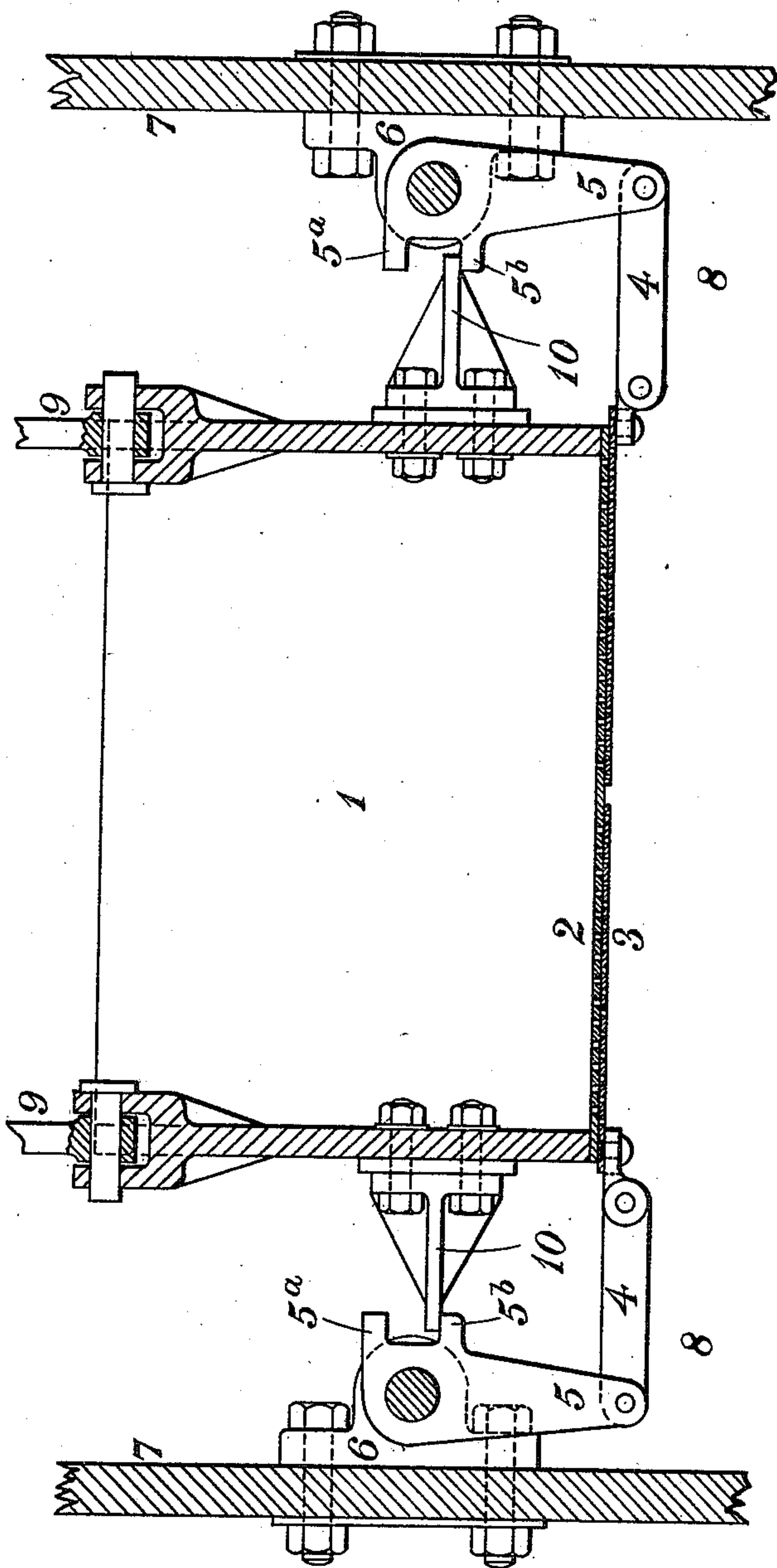


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN MARRIOTT DRAPER AND CHARLES HAMILTON, OF MANCHESTER, ENGLAND;
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COAL AND ORE WASHER OR SEPARATOR.

998,606.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed August 19, 1910. Serial No. 578,024.

To all whom it may concern:

Be it known that we, JOHN MARRIOTT DRAPER, chemist, a citizen of the United States of America, residing at Trafford Park, Manchester, England, and CHARLES HAMILTON, mechanical engineer and draftsman, a subject of the King of Great Britain, residing at 26 Railway road, Old Trafford, Manchester, England, have invented certain new and useful Improvements in Coal and Ore Washers or Separators, of which the following is a specification.

This invention relates to coal or ore washers or separators in which the material to be treated is fed into a receptacle provided with a perforated bottom through which a flow of liquid is produced by a jiggging motion imparted to the receptacle itself within a body of water contained in an outer tank in which said receptacle is mounted, the upward flow of the liquid through the perforated bottom of the receptacle and through the material contained therein serving to cause a stratification of such material according to the specific gravities of the constituent particles of the particular material under treatment.

It has been found in practice that on the upward movement of the box through the liquid in which same is immersed the travel of the liquid in a downward direction through the material contained therein creates a suction which draws the fine light upper portions of such material through the interstices between the lower larger heavier portions thereby neutralizing the desired first effective separation by gravitation which the upward flow of the liquid caused by the downward movement of said box has produced.

The object of the present invention is to overcome the disadvantages above indicated, and it consists essentially in the application directly to the underside of the ordinary perforated bottom of the receptacle of the class of machine above indicated, and in which receptacle the material is treated, of a second perforated bottom capable of sliding in relation to the former in a direction which is approximately at right angles to the reciprocating movement which is imparted to such receptacle, with the object closing the perforations in said ordinary perforated bottom at the required times to prevent the suction action through the ma-

terial by the downward travel of the liquid therethrough.

Figure 1 is a vertical section through the receptacle in which the material is to be treated and to which a vertical reciprocating movement is imparted. Fig. 1^A is a diagram showing the periods when the bottom of the receptacle illustrated in Fig. 1 is opened and closed. Fig. 2 is a similar section to that shown in Fig. 1 showing a modified method of actuating the second perforated bottom. Fig. 2^A is a diagram showing the periods when the bottom of the receptacle illustrated in Fig. 2 is opened and closed. Fig. 3 is a vertical section showing the method of actuating the second perforated bottom from the opposite sides of the receptacle.

In all these figures 1 is the jigger or box to which the material to be treated is supplied; 2 the ordinary perforated or sieve-like bottom thereof; and 3 the second perforated bottom arranged in contact with and beneath the former.

The required movement is imparted to the auxiliary perforated bottom 3 of box 1 by means of a link 4 to which same is connected at one side, and which is pivoted to a lever 5 mounted in stationary bearings 6 attached to the side 7 of the tank 8 containing the liquid in which the box 1 is caused to reciprocate from an overhead shaft (not shown) through the connecting rods or links 9.

If found necessary or desirable the arrangement above described for actuating the perforated bottom 3 may as shown in Fig. 3 be duplicated, a link 4 being arranged on each side of the box 1 and connected to separate levers 5 mounted on the shaft carried in the stationary bearings 6, and in this case said perforated bottom instead of being formed in a single plate is divided into two sections actuated simultaneously through such levers 5 and link connections 4.

The side of box 1 on which lever 5 is mounted is fitted with a projecting arm 10 which in the arrangement shown in Figs. 1 and 3 is situated between two abutments 5^a, 5^b, with which such lever 5 is provided, so that on the upward movement of box 1 its arm 10 will by contact with abutment 5^a of lever 5, through link 4 shift the perforated bottom 3 in relation to the bottom proper 2 so as to bring their perforations into coinci-

dence and thus on the downward movement of the box 1 afford free passage to the upward flow of liquid through the material resting on said bottom 2, and permit the stratification thereof according to the specific gravities of the constituent parts of such material.

On the termination of the downward travel of box 1 the projecting arm 10 thereon will by contact with the abutment 5^b of lever 5, through link 4, shift the perforated bottom 3 in the opposite direction and so close the perforations in the bottom proper 2 of box 1, and thus by preventing the downward flow of liquid which would otherwise occur through such box when same again ascends, avoid the carrying down of the light fine material which has been separated by the upward flow, from being drawn down between the interstices of the lower heavier portions of same resting on such bottom proper.

The small diagram Fig. 1^A indicates the action during an up and down movement of box 1, the bottom 2 of the box remaining open during the downward stroke thereof from *a* to *b*, then becoming cut off or closed from *b* to *d*, and remaining so cut off from *d* to *c*, and re-opening from *c* to *a*.

In the modification illustrated in Fig. 2 the arm 10 on the downward movement of box 1 by contact with abutment 5^b of lever 5 through link 4 shifts the perforated bottom 3 so as to close the perforated bottom 2 as in the previous arrangement, but said arm 10 does not serve to reopen the perforated bottom 2, for which purpose lever 5 is fitted with a plate 11 constituting a splash board and as box 1 after completing its upward stroke with its bottom closed, again begins to descend, such closed bottom acts as a plunger forcing the water up the outer sides of the box, and causing splash board 11 to lift, which by turning lever 5 on its pivot will through link 4 shift perforated bottom 2 so as to re-open the bottom proper 2 of box 1.

A fixed splash board 11^a is attached to the side of the tank 8 opposite to the side on which lever 5 carrying splash board 11 is situated, so as to oppose the passage of the liquid in an upward direction on this side of box 1.

The diagram Fig. 2^A illustrates the opening and closing action during a complete up and down movement of box 1 in the case of the arrangement last described, the bottom of such box remaining open from *a'* to *b'*, then closing from *b'* to *d'*, and remaining closed from *d'* to *c'*, and re-opening from *c'* to *a'*.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of an ore jigger having sieve-like apertures in its bottom and

provided with means for closing said apertures, said bottom being operative to support the material to be separated, mechanism for raising and lowering said ore jigger in a body of water, and means operatively connected to and actuated by said ore jigger in its upward and downward reciprocations for opening said apertures at the end of its upward stroke and closing them at the end of its downward stroke.

2. The combination of an outer receptacle for containing water, an ore receptacle for containing material of different degrees of fineness to be separated disposed in said outer receptacle and provided with a primary apertured bottom adapted to directly support the material to be separated and with a supplementary apertured bottom in contact with said primary bottom, mechanism for reciprocating said ore receptacle upward and downward in the water contained in said outer receptacle, and automatic means for shifting said supplementary bottom to open and close said apertures at the ends of the upward and downward strokes of said ore receptacle.

3. The combination of an outer receptacle for containing water, an ore receptacle for containing material of different degrees of fineness to be separated disposed in said outer receptacle and provided with a primary apertured bottom adapted to directly support the material to be separated, and with a supplementary apertured bottom disposed on the under side of said primary bottom in contact therewith, mechanism for reciprocating said ore receptacle upward and downward in the water contained in said outer receptacle, and automatic means for shifting said supplementary bottom to open and close said apertures at the ends of the upward and downward strokes of said ore receptacle.

4. The combination of an outer receptacle for containing water, an ore receptacle for containing material of different degrees of fineness to be separated disposed in said outer receptacle and provided with a primary apertured bottom adapted to directly support the material to be separated, and with a supplementary apertured bottom comprising two sections slidable in opposite directions for closing the apertures in said primary bottom, mechanism for reciprocating said ore receptacle upward and downward in the water contained in said outer receptacle, and automatic means for shifting said supplementary bottom to open and close said apertures at the ends of the upward and downward strokes of said ore receptacle.

5. The combination of an outer receptacle for containing water, an ore receptacle having apertures in its bottom and an apertured movable plate contacting with said bottom,

mechanism for reciprocating said ore receptacle upward and downward in the water contained in said outer receptacle, and automatic means actuated by the rise and fall of
5 said ore receptacle for opening said apertures at the end of the upward stroke and closing them at the end of the downward stroke thereof.

6. The combination of an outer receptacle
10 for containing water, an ore receptacle having apertures in its bottom and an apertured movable plate contacting with said bottom, mechanism for reciprocating said ore receptacle in the water contained in said

outer receptacle, and means disposed between said receptacles and actuated by the
15 rise and fall of said ore receptacle for opening said apertures at the end of the upward stroke of said receptacle and closing them at
20 the end of the downward stroke thereof.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN MARRIOTT DRAPER.

CHARLES HAMILTON.

Witnesses:

JOHN WILLIAM THOMAS,

MALCOLM SMETHURST.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
