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 MIXING, SEPARATING,
 AND SIFTING SOLIDS.
 PATENTED
 228

DRAUGHTSMAN.

No. 851,979.

PATENTED APR. 30, 1907.

W. BLACKMORE.
 ELECTROMAGNETIC SEPARATOR.
 APPLICATION FILED SEPT. 19, 1904.

2 SHEETS—SHEET 1.

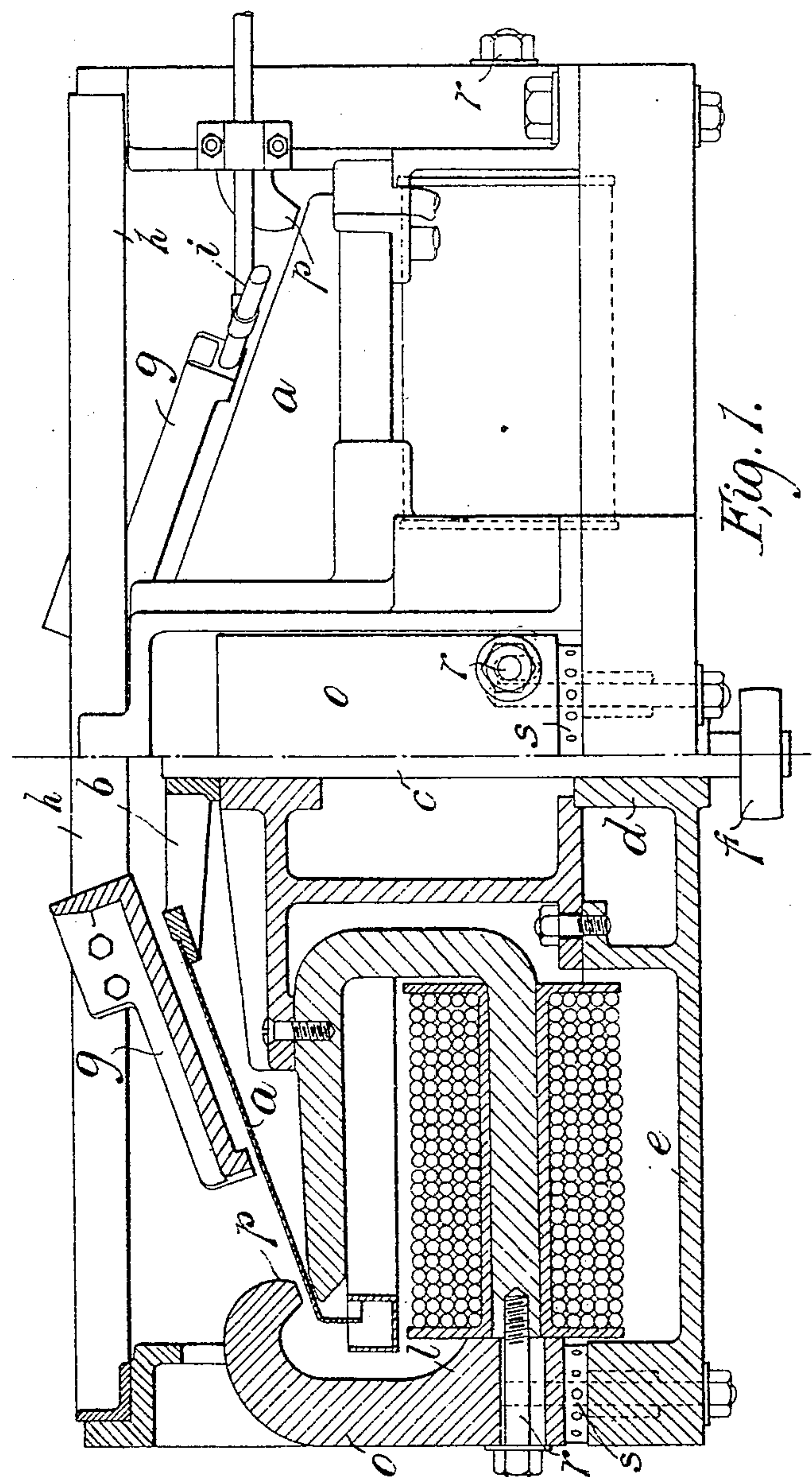


Fig. 1.

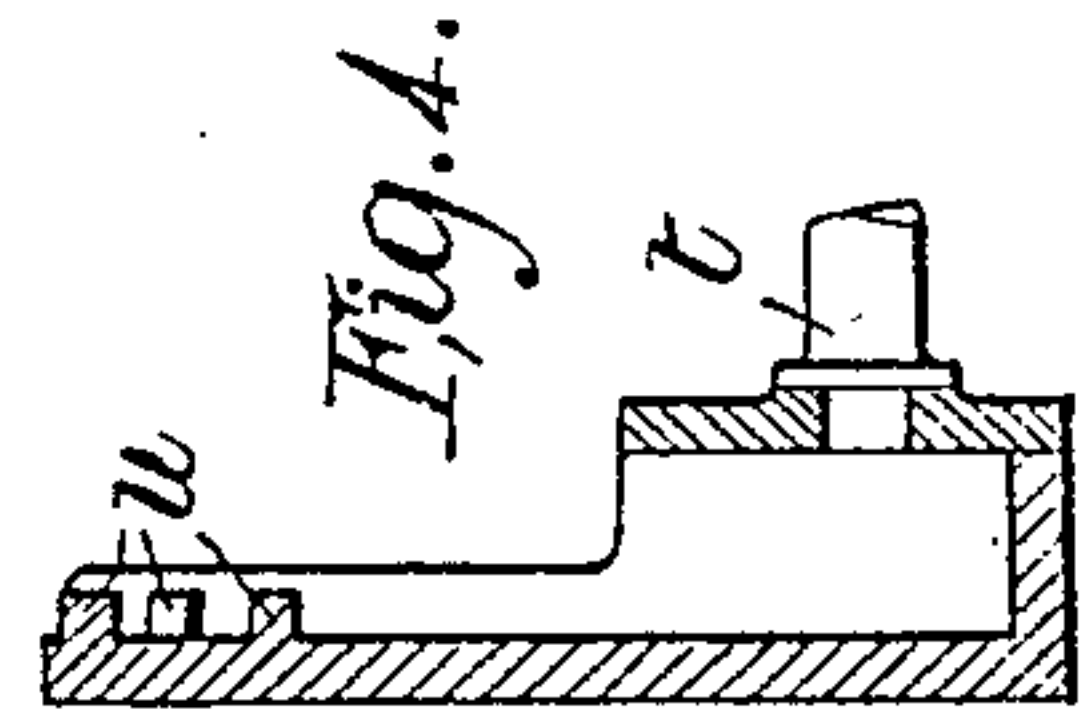


Fig. 4.

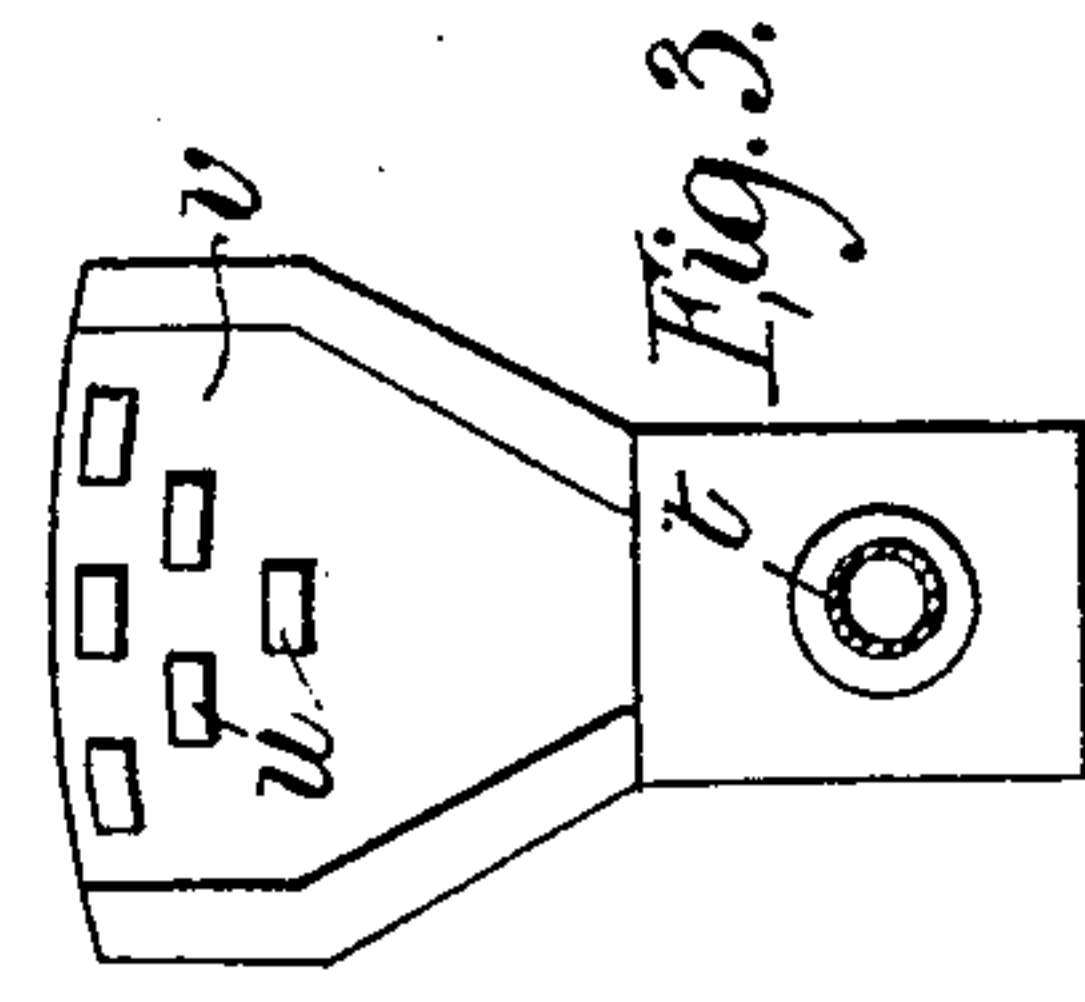


Fig. 3.

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 Attorney

ASSORTING-SOLIDS.

SEMI-CELLS.

478 and Separators.

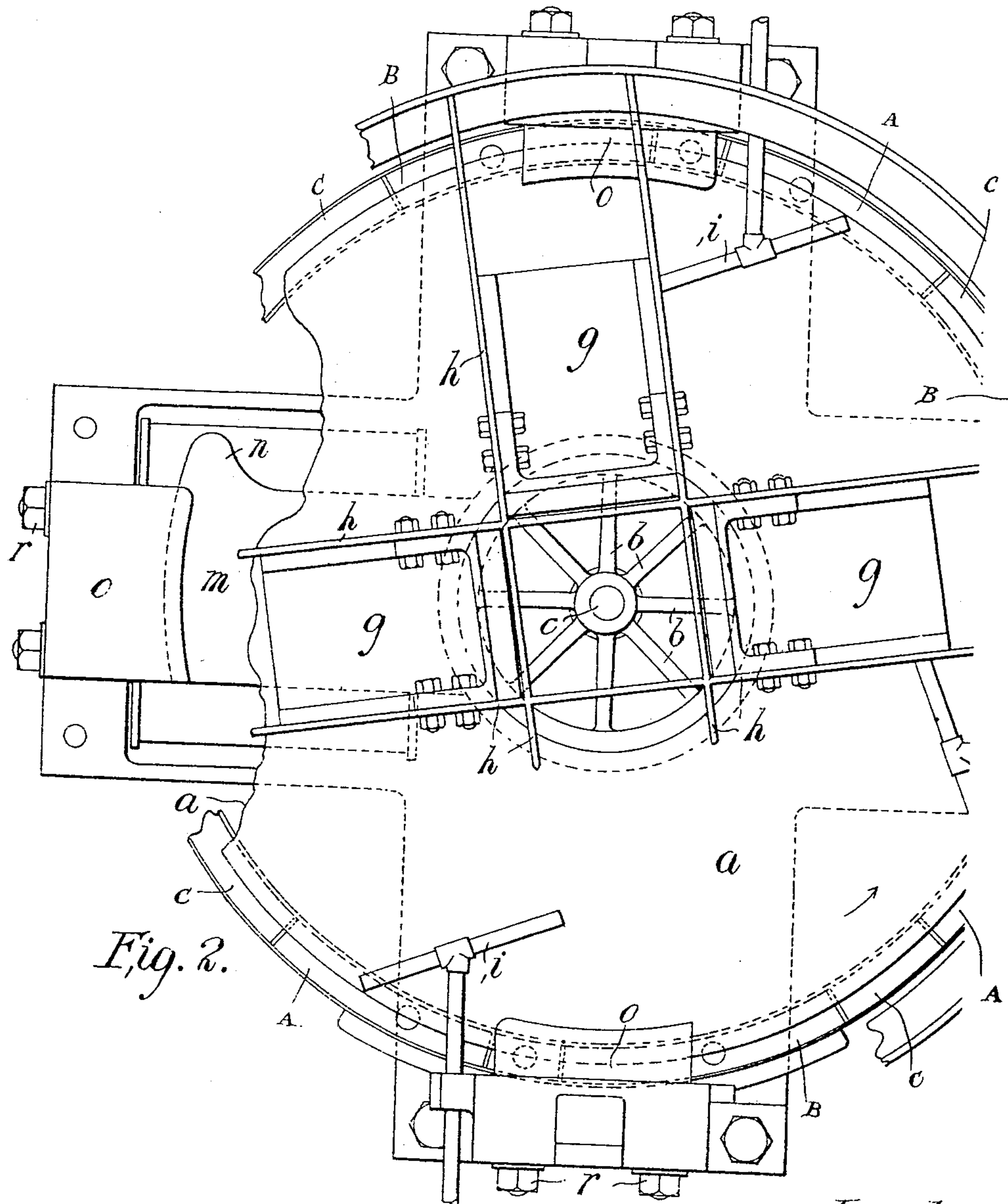
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM BLACKMORE, OF LONDON, ENGLAND.

ELECTROMAGNETIC SEPARATOR.

No. 851,979.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed September 19, 1904. Serial No. 225,107.

To all whom it may concern:

Be it known that I, WILLIAM BLACKMORE, a subject of the King of Great Britain and Ireland, residing at 5 Bishopsgate Street Within, London, E. C., England, have invented Improvements in Electromagnetic Separators, of which the following is a specification.

This invention relates to the separation of ores of more or less magnetic permeability by passing such ores crushed and in a wet state through a strong magnetic field.

The invention consists in distributing the ore from distributing boxes on to a revolving conical table whose rim passes between opposing pole pieces of an electromagnet, in such a manner that magnetic particles of ore are retarded between the point of feed and the edge of the table, and are so separated from non-magnetic particles.

The invention also consists in the form of the electro-magnets and in details of the apparatus employed.

Referring to the accompanying drawings:—

Figure 1 is an elevation partly in section of my apparatus suitable for treating ore in a wet state. Fig. 2 being a plan of the same, with part of the revolving table cut away; Fig. 3 is a plan of an alternative form of distributing box; while Fig. 4 is a sectional view of the same.

The conical table, *a*, of non-magnetic material is carried by a wheel, *b*, mounted on a vertical shaft, *c*, rotating in bearings, *d*, in the frame, *e*, of the machine, the shaft, *c*, being rotated by a driving pulley, *f*, or any other convenient means. The distributing boxes, *g*, are supported on cross pieces, *h*, fixed to the frame of the machine. The ore to be treated is fed by any suitable wet ore pulp feeder into these distributing boxes and washed on to the revolving table by a stream of water supplied to the boxes in any convenient manner. Water pipes, *i*, supported in the main frame of the machine, are provided at the side of each box toward which the revolving table moves. The pipes, *i*, are provided with jets, which assist the washing away of the ore which has been carried by the revolving table out of the stream from the distributing boxes, and give the magnetic products a final washing to free it from any adhering non-magnetic particles.

Electromagnets, *l*, are fixed by bolts to the frame of the machine, being placed at intervals slightly in advance of the distributing

boxes with their poles one on each side of the conical table, *a*, preferably near the edge. The edges of the pole pieces of each magnet are concentric with the edge of the revolving table. The pole piece, *m*, below the table is convex in shape and is preferably provided with a projection, *n*, in the direction in which the table moves, and may be tapered as shown in Fig. 1. This projection is not absolutely essential but is a convenient arrangement for collecting the magnetic material on the cover at a point beyond the area of feed so that it can be easily sprayed off by the water jets. The pole piece, *o*, above the table may be tapered at its end, *p* as shown in Fig. 1, and rounded off as shown in Fig. 2, and may if desired be formed separate from the body of the magnet, being attached thereto by a bolt, *r*, passing through a slot in the pole piece, thus allowing an adjustment of the distance between the pole pieces by means of the screw piece, *s*. It is obvious that in this construction of electromagnet the pole piece is adjustable also in an horizontal direction by the bolt *r*. To preserve continuity of the magnetic circuit iron or steel washers or distance pieces (not shown) would of course be inserted between *l* and *m*. Collecting boxes may be placed below the edge of the conical table, *a*, in suitable positions.

Figs. 3 and 4 show an alternative form of distributing box; in this box water and ore are supplied through the pipe, *t*, in the form of ore pulp, between the projections, *u*, in the fan shaped mouth, *v* of the box.

In the apparatus above described which is suitable for treating ore in a wet state the angle of inclination of the surface of the conical table should be sufficiently great to prevent ore settling on the table, say about 20°.

The operation of the machine is as follows:—The wet ore pulp from each distributing box is washed down the surface of the conical table in a stream which passes between the poles of the corresponding magnet. The magnetic particles are retarded in their passage down the table by the action of the magnetic field and are carried on by the table farther in the direction of rotation than the non-magnetic particles, and so are washed into collecting boxes A placed in advance of those, designated B, which collect non-magnetic particles.

In these machines there is no distinct line

of demarcation at which the separation of the magnetic from the non-magnetic particles of ore ceases and I have found it advisable to place a third collecting box C between the two which collect magnetic and non-magnetic particles; the ore falling into this additional collecting box is partly magnetic and partly non-magnetic and may be passed a second time through the machine.

10 In the apparatus illustrated I have shown four magnets and the corresponding distributing and collecting boxes; but I may provide a greater or less number if desired.

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

1. A magnetic ore wet separator, comprising in combination, a revolving conical table, a plurality of separate electromagnets disposed at intervals around said table, windings on the electromagnets, electro- magnet pole pieces on each side of said table, the upper pole pieces of said magnets being removable without moving the windings, distributing boxes for distributing ore on to said table, and water jets for distributing water on to said table, as set forth.

2. A magnetic ore wet separator, comprising in combination, a revolving conical table, a plurality of separate electromagnets disposed at intervals around said table, electro- magnet pole pieces on each side of said table, the lower pole pieces being fixed to the frame of the machine, the upper pole pieces being adjustable in a vertical direction, means securing said upper pole pieces to said lower pole pieces, the upper pole pieces of said magnets being removable without moving the windings thereof, distributing boxes for distributing ore on to said table, and water jets for distributing water on to said table, as set forth.

3. A magnetic ore wet separator comprising in combination, a revolving conical table, a plurality of separate electromagnets disposed at intervals around said table, electromagnet pole pieces on each side of said table, the lower pole pieces being fixed to the frame of the machine, said lower pole pieces only having windings thereon, upper pole pieces having slots therethrough, screw means engaging said lower pole pieces, the diameter of said slots being greater than

the diameter of said screw means, the upper pole pieces being adjustable in a vertical direction and removable without moving the windings, distributing boxes for distributing ore on to said table, and water jets for distributing water on to said table, as set forth.

4. A magnetic ore wet separator comprising in combination, a revolving conical table, a plurality of separate electromagnets disposed at intervals around said table, windings on the electromagnets, electro- magnet pole pieces on each side of said table, the upper pole pieces of said magnets being removable without moving the windings, distributing boxes for distributing ore on to said table, said distributing boxes having fan shaped mouths with projections in said mouths, and water jets for distributing water on to said table, as set forth.

5. A magnetic ore wet separator comprising in combination, a revolving conical table, a downwardly projecting rim to said table, collecting boxes arranged about said rim to collect the different qualities of the ore, a plurality of separate electromagnets disposed at intervals around said table, windings on the electromagnets, electro- magnet pole pieces on each side of said table, the upper pole pieces of said magnets being removable without moving the windings, distributing boxes for distributing ore on to said table, and water jets for distributing water on to said table, as set forth.

6. A magnetic ore wet separator comprising in combination, a revolving conical table, a plurality of separate electromagnets disposed at intervals around said table, windings on the electromagnets, electromagnet pole pieces on each side of said table, the upper pole pieces of said magnets being removable without moving the windings, distributing boxes for distributing ore on to said table, and water jets disposed tangentially at intervals around said table for distributing water on to said table, as set forth.

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

WILLIAM BLACKMORE.

Witnesses:

ALBERT E. PARKER.
FRANCIS J. BIGNELL.