

No. 859,483.

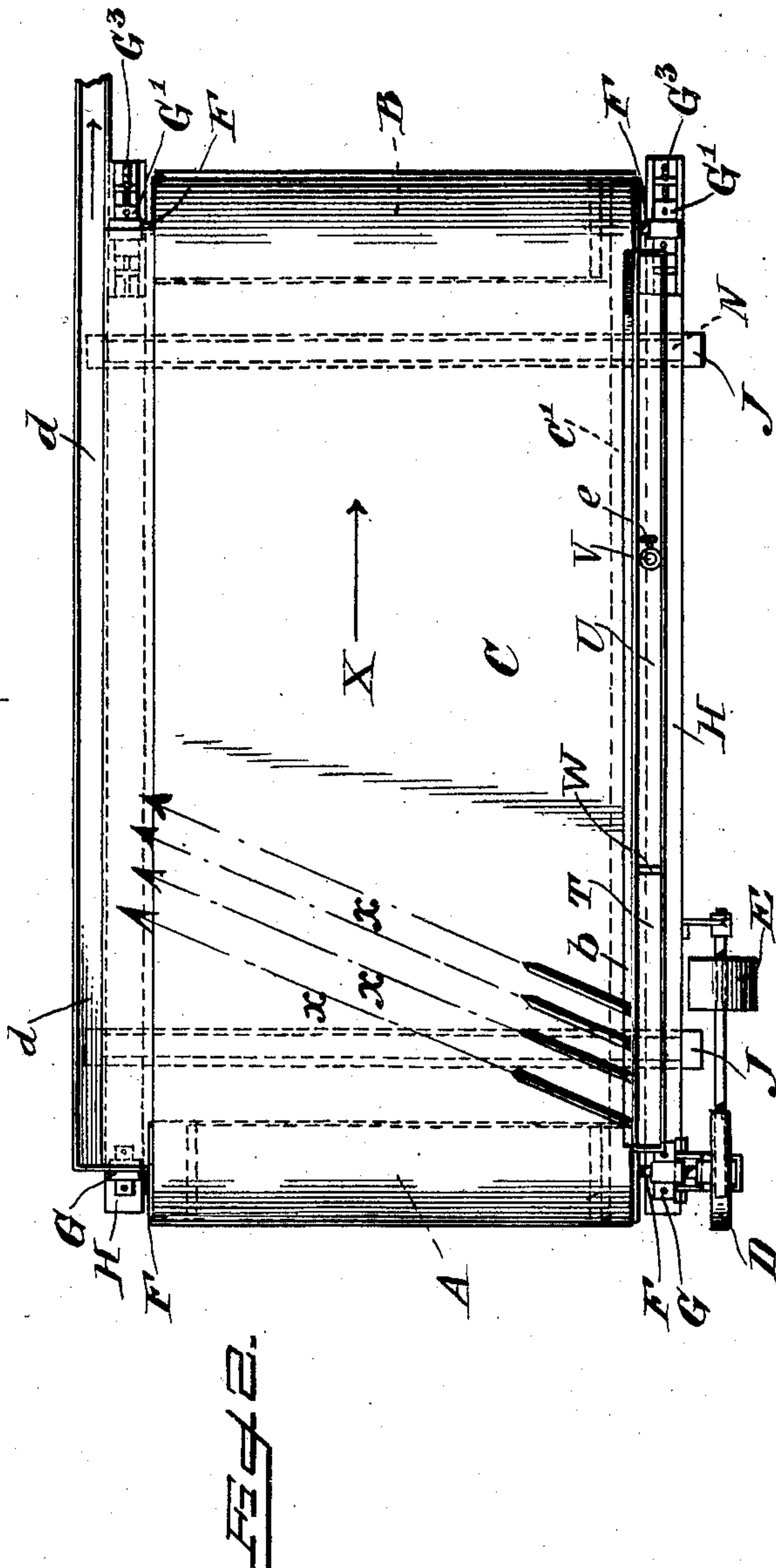
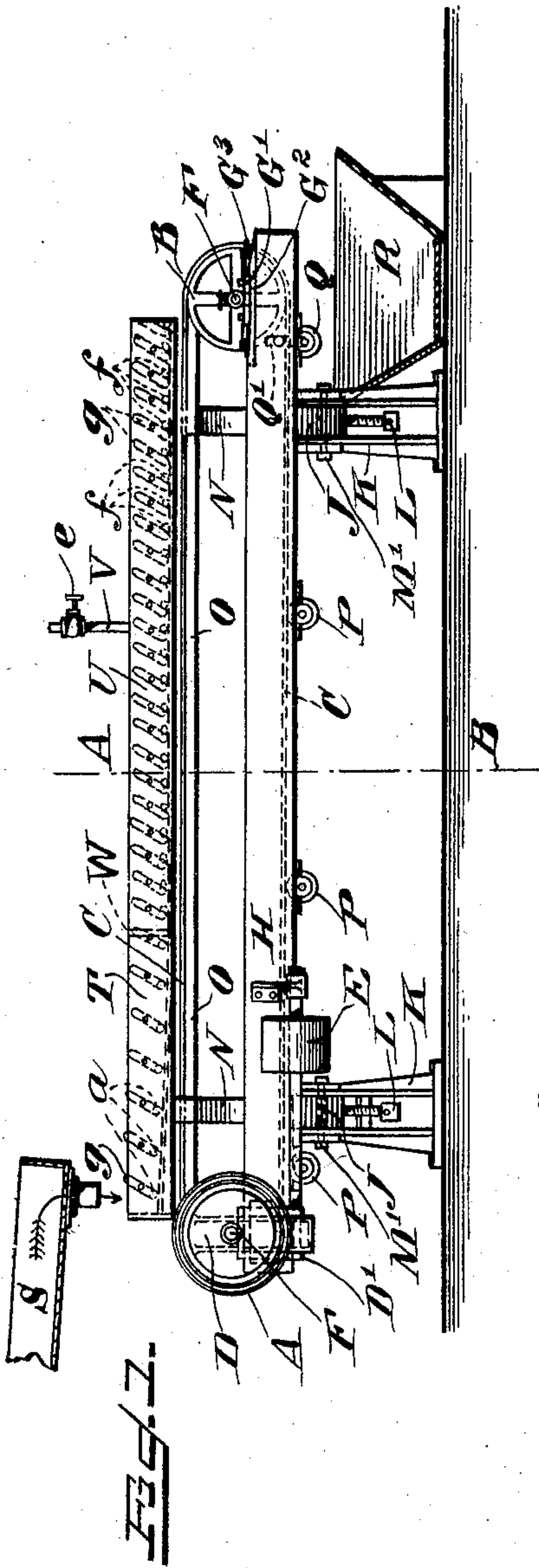
PATENTED JULY 9, 1907.

J. M. CALLOW & J. W. NEILL.

ORE CONCENTRATING AND SEPARATING MACHINE.

APPLICATION FILED JULY 7, 1905.

2 SHEETS—SHEET 1.



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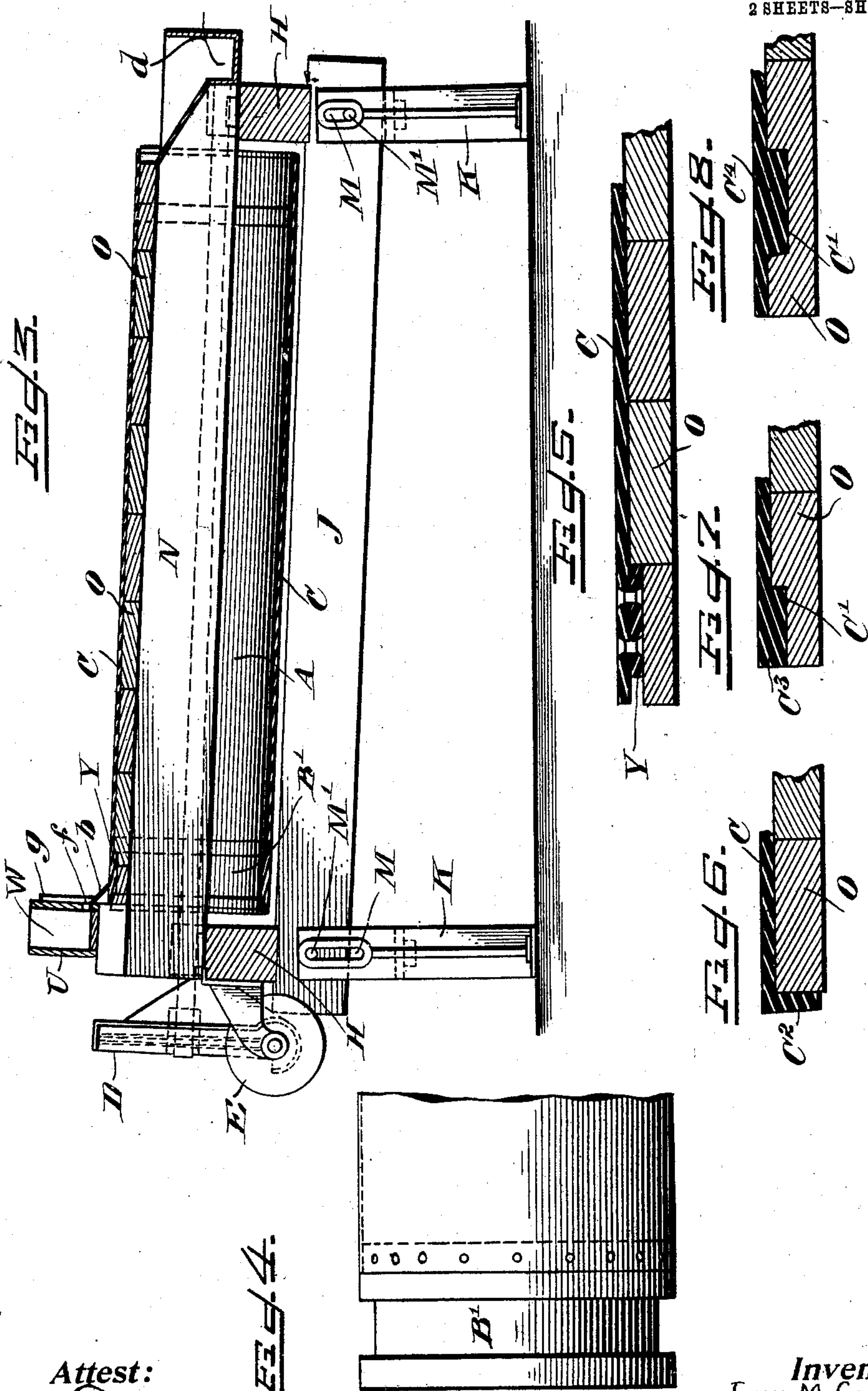
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN M. CALLOW, OF SALT LAKE CITY, UTAH, AND JAMES WILSON NEILL, OF BUTTE, MONTANA.

ORE CONCENTRATING AND SEPARATING MACHINE.

No. 859,483.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed July 7, 1905. Serial No. 268,759.

To all whom it may concern:

Be it known that we, JOHN M. CALLOW and JAMES WILSON NEILL, a subject of Great Britain and a citizen of the United States, respectively, residents of Salt Lake City, Utah, and Butte, Montana, respectively, have invented certain new and useful Improvements in Ore Concentrating and Separating Machines, of which the following is a specification, accompanied by drawings.

10 This invention relates to improvements in that class or type of ore dressing machines which employ a traveling endless belt on which is effected the separation of the worthless gangue from its valuable mineral contents.

15 The invention also has special reference to that class of concentrating machinery which is especially adapted to the separation of finely divided and wet pulps, although the machine may be utilized with any kind of material to which it is applicable.

20 The objects of the invention are to effect more perfect separation of the mineral from the gangue and increase the efficiency and certainty of operation of the machine with simplicity of parts.

Further objects of the invention will hereinafter appear and to these ends the invention consists of apparatus for carrying out the above objects embodying the features of construction, combinations of elements and arrangement of parts having the general mode of operation substantially as hereinafter fully described in this specification and shown in the accompanying drawings, in which,—

Figure 1 is a longitudinal vertical side elevation of the machine; Fig. 2 is a plan view of the machine; Fig. 3 is a transverse sectional end view of the machine on the line A B of Fig. 1; Fig. 4 is an enlarged view of the upper end of the revolving end rollers; Figs. 5, 6, 7 and 8 are enlarged transverse sectional views of different forms of belt flanges.

According to this invention, the ore concentrating and separating machine is provided with an endless traveling belt or screen, the transverse inclination of which may be adjusted as desired. Beneath the upper or carrying side of the belt is arranged a deck or table or carrying plane for supporting the belt, preferably over substantially its entire surface. A feed box is arranged along the upper side of the belt, a fresh water box for supplying wash water to the machine is provided and both the speed of the belt and the belt tension may be adjusted. Means are also provided for guiding the belt longitudinally on the deck or carrying plane and on the end rollers to prevent its slipping sidewise.

Referring to the drawings, K represents floor stands upon which are adjustably mounted cross timbers J and longitudinal timbers H forming the main frame

of the machine. Other cross timbers N are provided on the longitudinal timbers H for supporting the deck or table or carrying plane O, over which the endless traveling belt C passes.

The belt or screen C is provided with a head roller 60 A and a tail roller B having shafts F suitably journaled in boxes G and G' shown in this instance supported upon the longitudinal beams H. The tail roller B' is preferably longitudinally adjustable in order to adjust the belt tension and as shown the boxes G' 65 are arranged upon slides G² connected to be adjusted by screws G³.

Suitable means are provided for actuating the belt or screen from the head roller A, in this instance, said roller being provided with a worm wheel D' actuated 70 from the worm shaft D' which is driven from the driving roller E. The speed of the belt may be varied by varying the speed of the driving roller E which may be actuated from any suitable source of power.

As shown, the deck or carrying plane O is arranged 75 to support substantially the entire surface of the upper portion of the belt and extends from the head roller to the tail roller, being tangent to the peripheries of said rollers. The under side of the belt is preferably supported upon the carrying rollers P, while a concentrate 80 roller Q is provided beneath the tail roller B' to discharge the concentrates which may have gathered on the belt, into the concentrate box R.

By means of the adjusting screws L which support the cross timbers J, the transverse inclination of the belt 85 may be adjusted. As shown, the floor stands K are provided with slots M, into which project the bolts M' to guide the timbers J.

At the receiving end of the belt is provided a supply launder S, which discharges into the feed box T arranged along the upper edge of the upper side of the belt and provided with discharge orifices *a*. Preferably adjacent the feed box T is a clear water box U extending along the upper edge of the upper side of the belt and provided with discharge orifices *f*. The orifices *a* and *f* are provided with covers *g* which may be adjusted to vary the openings. Any suitable means may also be provided for adjusting the distance of the concentrate roller Q from the lower side of the belt. As shown, the brackets or arms Q' which carry the roller Q 100 may be adjusted at different heights upon the longitudinal beams H by means of pegs or bolts which co-operate with holes in the beams. The wash water is supplied to the clear water box U from any suitable source, as the water supply pipe V, provided with a cock *e*, and 105 as shown a partition W separates the feed box from the water box U.

Suitable means are provided for preventing the belt from moving sidewise and working its way down the incline on the table O. Preferably the upper ends of 110

the rollers A and B are grooved as shown in Fig. 4 at B' and the table C is also provided with a longitudinal groove C' along its upper edge which registers with the grooves B' in the rollers. The belt or screen C is provided with a projecting portion adapted to lie in said grooves and prevent the belt from moving sidewise. In Fig. 5, this projecting portion on the belt is shown in the form of a supplementary strip of belting Y, which lies in the grooves and is suitably secured to the main portion of the belt. This is a simple and convenient arrangement, but the invention is not to be understood as limited or confined to this particular device for the same results may be accomplished in other ways.

A modified form of belt is shown in Fig. 6 in which the upper edge of the belt is provided with a flange C² extending over the edge of the table. In this case the grooves on the table and rollers may be dispensed with.

In Figs. 7 and 8 modifications are shown in which rubber flanges C³ and C⁴ are cast on the belt or formed integral therewith and adapted to co-operate with the grooves C' and B' in the table and rollers respectively.

The operation of the machine is as follows: The belt travels in the direction of the arrow X on Fig. 2 from the head roller to the tail roller and the pulp or material to be concentrated is discharged from the orifices *a* in feed box T to the apron *b* and thence to the belt C. The forward travel of the belt causes the pulp to take a diagonal course across the belt in the direction indicated by the lines *x* of Fig. 2 towards the catch launder *d*. The heavier matter at once settles on the belt while the balance flows off into the tailing or catch launder *d*. The forward travel of the belt carries the material opposite the fresh water box U from which the fresh water washes off the materials of lighter specific gravity into the catch launder *d*, leaving the valuable and heavier material attached and clinging to the belt C. The amount of wash water is regulated at the valve *e* and is distributed along the length of the box U, the discharge openings or orifices *f* of which may be adjusted as desired by means of the covering buttons *g*. The travel of the belt C continues to carry forward the clinging and adhering mineral onto and over the tail roller B where it eventually comes into contact with the small

roller Q to which it is transferred and from thence drops into the concentrate box R. The table or plane O causes the top or working side of the belt C to assume a perfectly smooth and unruffled surface or plane.

It is to be understood that the operations described are uniform and continuous. The amount of worthless gangue rejected can be increased by varying the inclination at which the belt lies, by varying the amount of fresh water supplied to do the washing or again by varying the speed at which the belt C is caused to travel.

Obviously some features of this invention may be used without others and the invention may be embodied in widely varying forms.

Therefore, without limiting the invention to the devices shown and described, and without enumerating equivalents, we claim and desire to obtain by Letters Patent the following:

1. In an ore concentrating and separating machine, the combination with the endless traveling belt and end rollers, of a deck or carrying plane arranged beneath the upper side of the belt for supporting the same, said belt being provided on its under side at one edge thereof with a continuous relatively broad projecting portion, said deck having a co-operating guiding groove, said end rollers also having a groove registering with the groove on said deck and co-operating therewith for guiding the belt in a longitudinal direction to prevent the belt from slipping sidewise.

2. In an ore concentrating and separating machine, the combination with the endless traveling belt and end rollers, of a transversely inclined deck or carrying plane arranged beneath the upper side of the belt for supporting the same, said belt being provided on its under side near the upper edge thereof with a continuous relatively broad projecting portion, said deck having a co-operating guiding groove, said end rollers also having a groove registering with the groove on said deck and co-operating therewith for guiding the belt in a longitudinal direction to prevent the belt from slipping sidewise.

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

JOHN M. CALLOW.

Witnesses:

FRANK E. JOHNSON,
LEONARD CAHOON,

JAMES WILSON NEILL.

Witnesses:

S. LEWIS MOODY,
OLIN A. FOSTER.