

(No Model.)

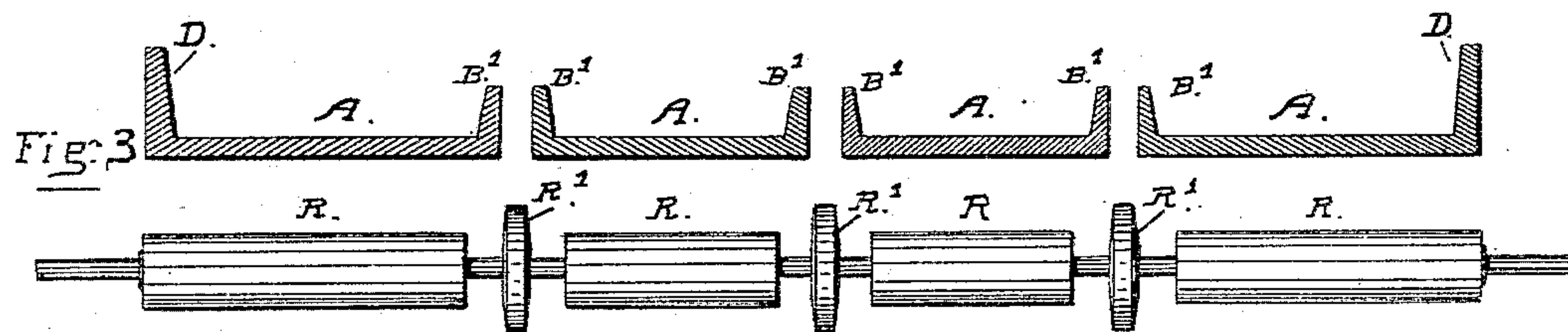
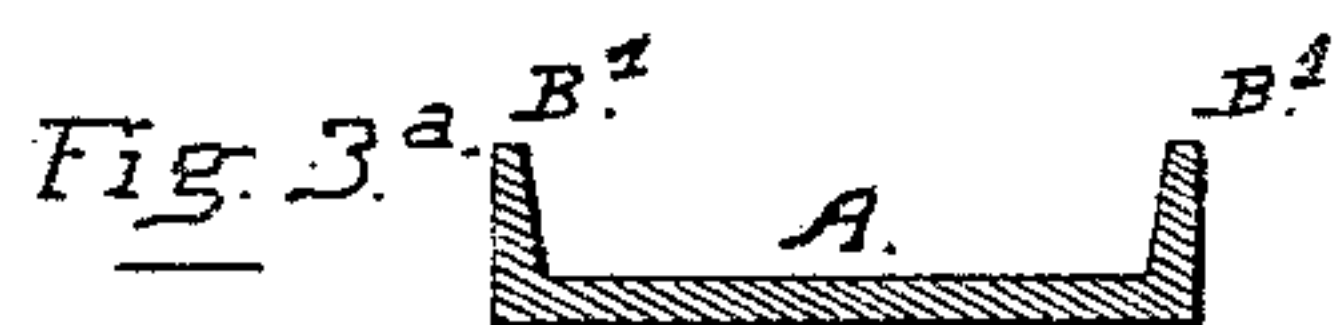
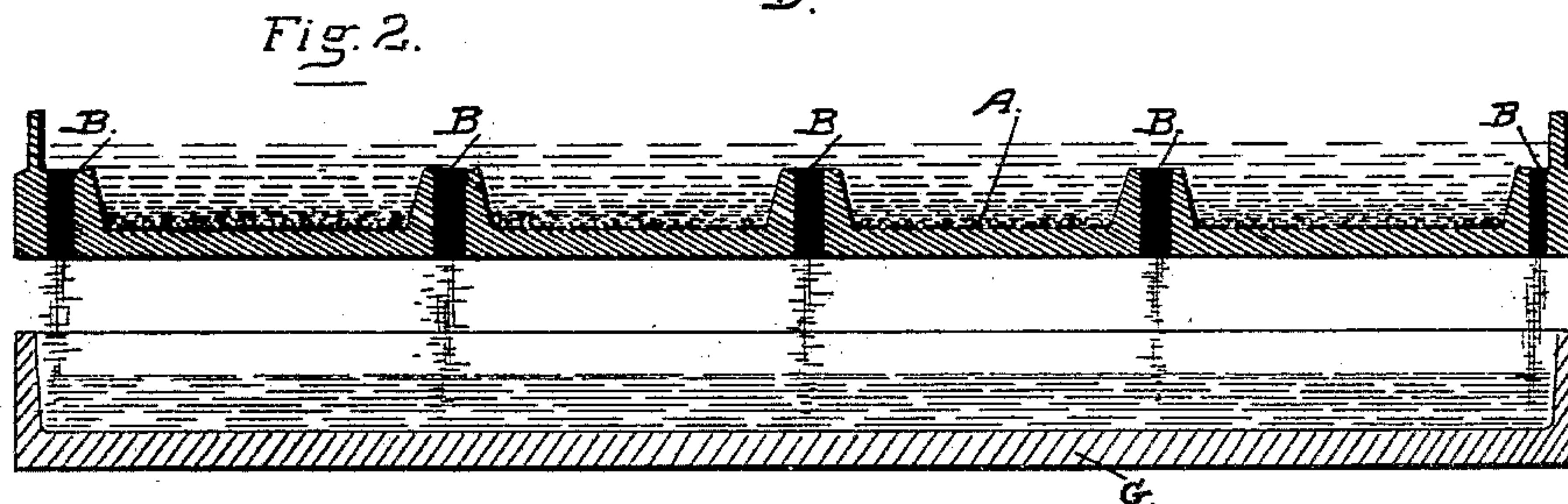
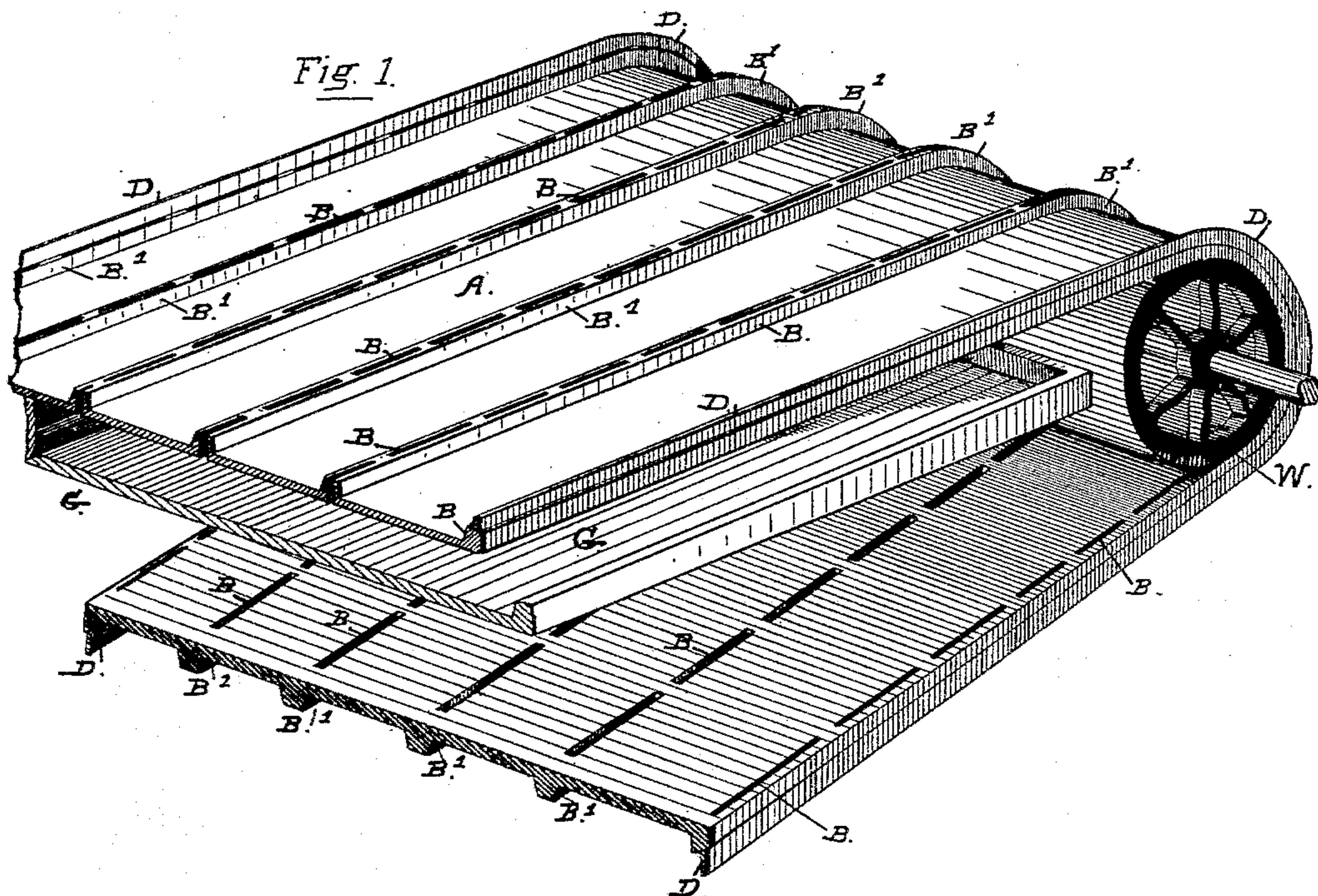
2 Sheets—Sheet 1.

I. A. WOODBURY.

BELT OR ENDLESS APRON FOR ORE CONCENTRATORS.

No. 387,964.

Patented Aug. 14, 1888.



WITNESSES.

J. M. Kell.
A. H. Bulsman.

INVENTOR:

Isaac A. Woodbury.
By John C. Parker.
Attorney.

(No Model.)

2 Sheets—Sheet 2.

I. A. WOODBURY.

BELT OR ENDLESS APRON FOR ORE CONCENTRATORS.

No. 387,964.

Patented Aug. 14, 1888.

Fig. 4.

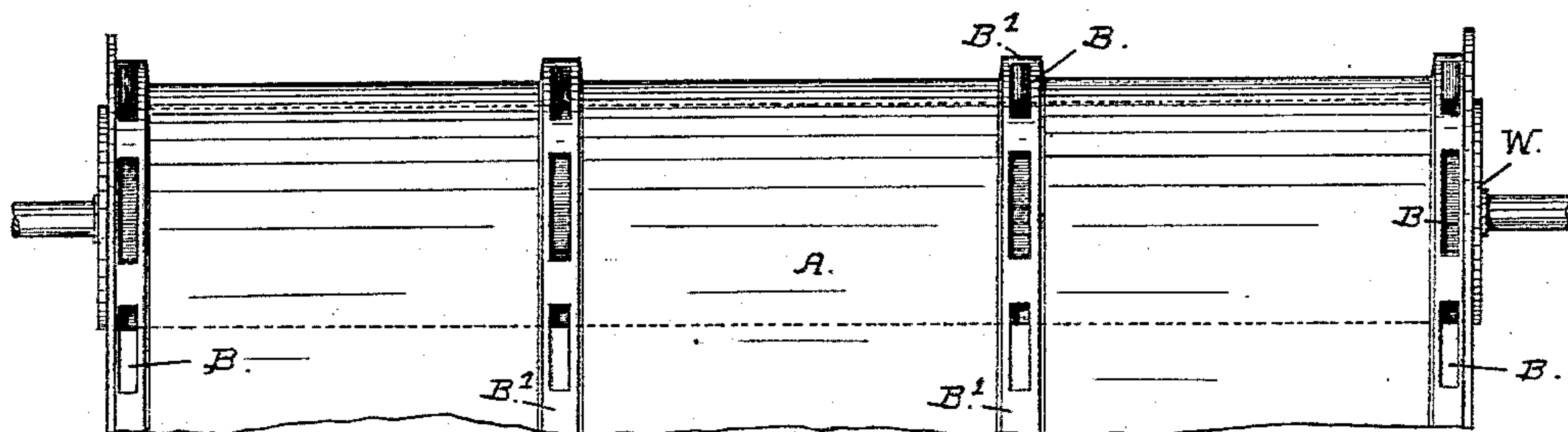


Fig. 5.

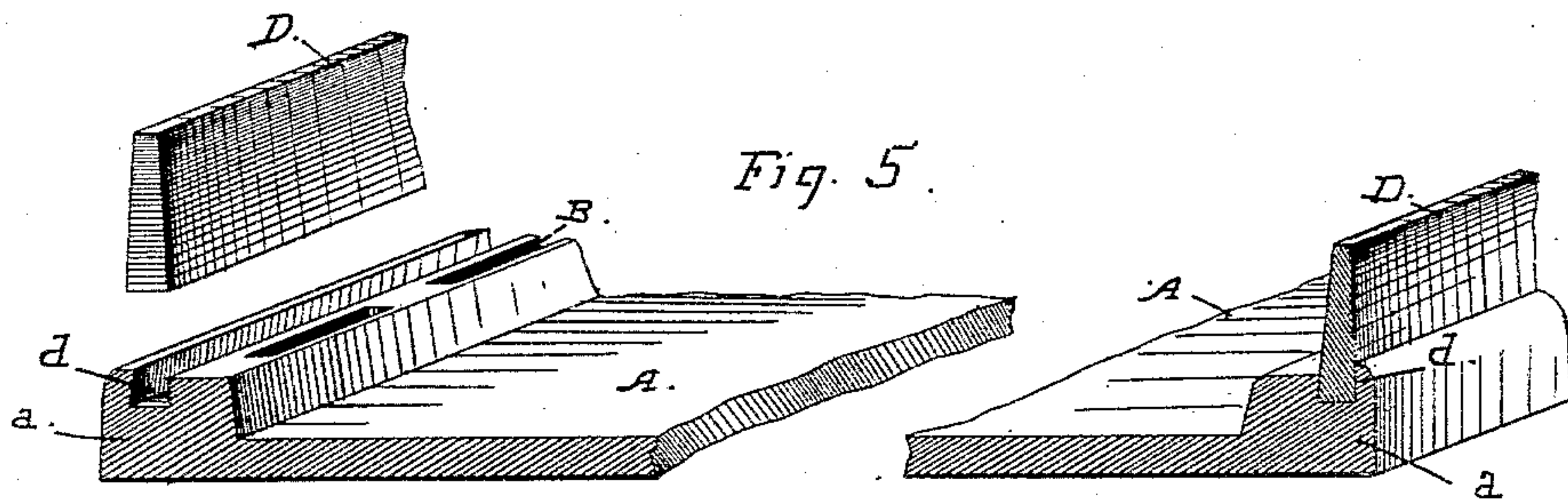
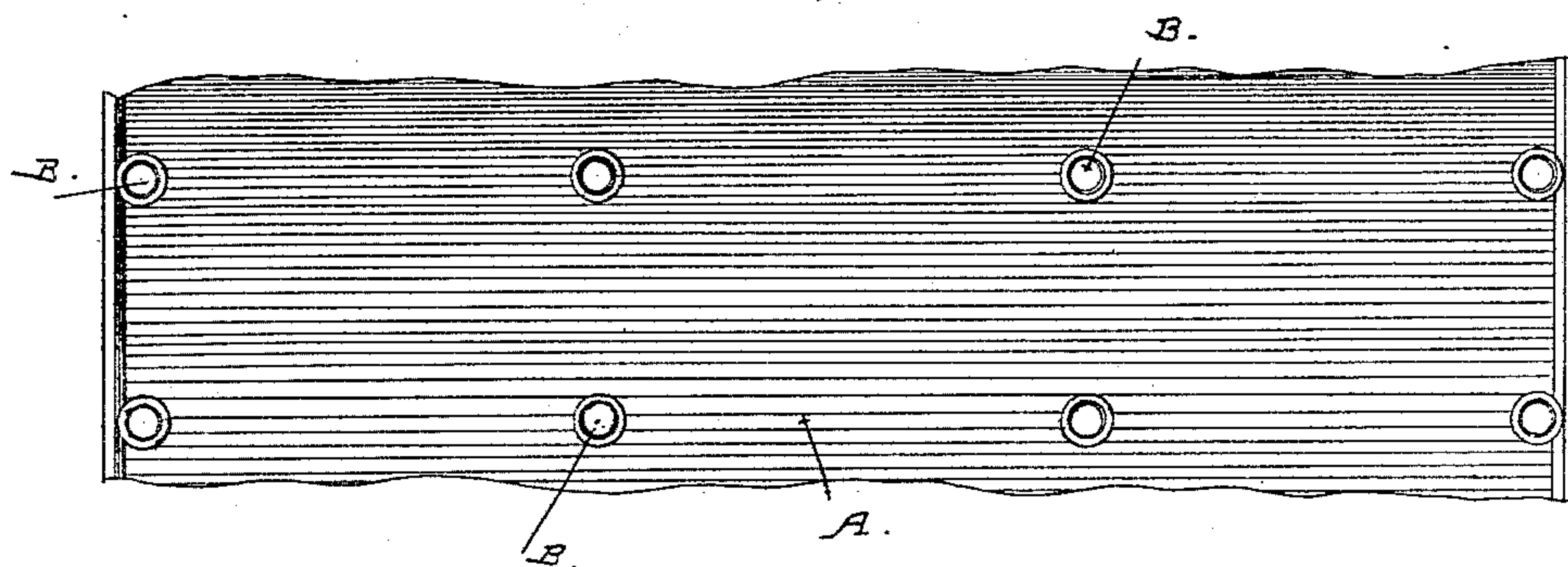


Fig. 6.



WITNESSES:

Fred C. Taster.
Chas. J. Stockman.

INVENTOR,

Isaac A. Woodbury.
BY John C. Taster.

ATTORNEY.

UNITED STATES PATENT OFFICE.

ISAAC A. WOODBURY, OF EAST CAMBRIDGE, MASSACHUSETTS.

BELT OR ENDLESS APRON FOR ORE-CONCENTRATORS.

SPECIFICATION forming part of Letters Patent No. 387,964, dated August 14, 1888.

Application filed March 9, 1887. Serial No. 230,215. (No model.)

To all whom it may concern:

Be it known that I, ISAAC A. WOODBURY, a citizen of the United States, residing in East Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Belts or Endless Aprons for Ore-Concentrators; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the drawings that accompany and form part of this specification.

My invention relates to improvements in sluiced belts or endless aprons; and it consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

The following description clearly explains the nature of my said improvements and the manner in which I have produced and applied them in carrying out my invention, the accompanying drawings being referred to by figures and letters.

Figure 1 is a partial perspective view of a concentrator-belt embodying my improvements, and is taken from one end. The small rollers that carry the upper or acting surface of the belt are omitted. Fig. 2 is a cross-section taken at any point through the belt to intersect the outlet-apertures. Fig. 3 illustrates a mode of producing an endless traveling concentrating-surface with outlets through it and longitudinal partitions separating it into spaces or compartments in accordance with my invention by the use of separate narrow belts or strips with raised edges. Fig. 3^a is a detail cross-section of one of the separated belts shown in Fig. 3. Fig. 4 is a plan view of a portion of the belt. Fig. 5 shows in detail the mode of attaching the said strips to the belt. Fig. 6 represents in plan view a portion of a belt-surface having outlets without partitions.

Like letters denote like parts.

In my invention I provide an improved construction of raised side or edge, by which a person of ordinary skill can easily repair this part of the belt when it becomes cracked or worn out. I also secure a practically unlimited discharge of watery or more fluid portions of the matter under treatment from above the heavier portions of the matter equally over the whole acting-surface of the belt by draw-

ing it off through numerous outlet-apertures in the belt, the edges of which outlets are raised above the belt-surface to prevent the escape of the lower portion of the stratum of pulp. To insure conditions of uniform distribution and regular depth of material upon the belt, I divide its surface by longitudinal partitions into separate spaces or compartments and supply the pulp and water to each one independently. These partitions are of flexible or elastic character, the same as the raised edges of the belt, but in height are somewhat less than the edges.

Fig. 1 of the drawings shows the lower end or tail portion of an endless belt constructed of suitably-flexible material—such as rubber cloth—and having all my said improvements applied in its construction.

A is the body of the belt, and D represents the raised sides.

B denotes apertures in the body leading directly through it from the pulp-supporting surface, but having their mouths or edges elevated above the surface. This elevation of the outlet-apertures may be produced in several ways, depending on the form or character of concentrating-surface required and the manner in which the apertures are formed. Thus, in constructing a belt with longitudinal divisions or spaces, the apertures are made through the raised strips that separate the surface into such spaces, and the height of the strips above the surface determines the amount of elevation of the outlets; or in that modification represented in the sectional view, Fig. 3, in which the outlets are produced by arranging several narrow belts side by side on rollers in such manner that a space between the adjacent edges of every two belts is maintained, the raised edges of the belts constitute the rims of the outlet-apertures formed by the spaces between the belts; but in the case of a belt having no such dividing-strips or partitions the mouths of the apertures would be raised by other means, as by fixing a block or cylindrical piece to the belt around each opening or in any suitable way forming a rim above the surface around each outlet at the time of molding the belt.

Fig. 6 represents a portion of a belt-surface having outlets without partitions. The outer edges of the belt are higher than the rims and as much higher than these rims as the

whole depth of the pulp and the water calls for. In following my mode of producing this edge the margin of the belt is formed with a ledge somewhat thicker than the body of the belt and of uniform height and thickness. A groove or channel extending into the ledge from the top is made of sufficient width and depth to take a thin strip of rubber or other suitably-elastic material, which is set into the groove in such manner that it stands vertically or upright with respect to the surface of the belt, and by means of cement the strip is fixed in place. I usually make the ledge or thicker standing portion along the edges of the belt of sufficient width to permit a row of outlet-apertures to be made through it just inside of the upright strip, as shown in Fig. 5. To repair the raised sides of such construction it is only necessary to loosen and remove the old strip or any portion of it, as circumstances may require, and then insert and fix in the groove a new strip, care being taken to properly scarf and join the ends when a new piece is inserted. Between these outer raised sides of the belt the surface-outlets are distributed in lines at regular intervals and at greater or less distance apart, according to the area of outlet for discharge of water and worthless matter required in the belt. For general purposes I raise the mouths of the outlets about three-eighths ($\frac{3}{8}$) of an inch above the belt-surface; but I do not confine myself to any particular height, as this is best determined by the requirements of the work to be done, the character of the ore on which the machine is to work, and other conditions.

In the construction shown in Fig. 3 the outlets are continuous slots formed by keeping the edges of the narrow belts at uniform distance apart as the belts travel side by side over supporting-rollers. A simple and effective way of maintaining several belts in such position is to employ rollers having belt-carrying portions about equal in length to the width of the belt and a narrow disk whose thickness is equal to the space required between the edges of two belts or strips and whose diameter should be greater than the rollers, in order to let the disk set well up in the slot or space. A number of these rollers are mounted in the belt-carrying frame sufficiently close together to keep the edges of the belts at the same distance apart. By either of these two modes of construction illustrated by the sectional views, Figs. 2 and 3, the surface of the belt is separated into spaces or compartments running longitudinally and having about equal widths. To each space the pulp and water are supplied from a hopper and water-pipes at the head of the machine in the usual manner, excepting that the quantity of pulp and supply of water are regulated by separate gates and valves for each space or division, so that as the pulp becomes more dense or of irregular depth

under varying conditions of the ore and the motion of the belt the proportion of water may be increased or diminished to that part of the surface requiring it without disturbing the conditions upon the other portions of the surface.

In working some kinds of ore where large quantities of water are used this manner of dividing the belt surface into separate spaces and providing a separate water-supply for each space will be found of considerable advantage. The consistency of the pulp and its distribution at even depth can be maintained to an equal degree over the whole concentrating-surface without requiring that watchfulness and frequent adjustment in feed and movements of the belt heretofore demanded of the operator to prevent the matter from banking or accumulating at points on the belt-surface, particularly along the sides and across the lower end where the tailings pass off. By varying the size or number of the overflow-outlets with reference to the area of the belt-surface any desired degree of discharge for the surface-water and earthy matter can be afforded, and large quantities of water can be run over the pulp to great advantage in many cases.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A belt or endless apron for ore-concentrators, having overflow-apertures through it the mouths or edges of which are elevated above the pulp-holding surface, substantially as hereinbefore described.

2. An endless apron or flexible traveling concentrating-surface with raised sides, having overflow-apertures the mouths or edges of which are above the surface and below the line of said raised sides, substantially as hereinbefore described.

3. In a wet-ore concentrator, a belt or traveling concentrating-surface with dividing strips or partitions and overflow-apertures through said partitions, substantially as hereinbefore described.

4. A belt or traveling concentrating-surface for ore-concentrators, having raised sides, intermediate dividing-strips or partitions, and overflow-apertures, substantially as hereinbefore described, for operation as set forth.

5. A belt or endless traveling concentrating-surface composed of independent compartments with overflow-apertures adapted to discharge the water or fluid matter from each compartment through their bottoms and independently of the other compartments forming the said concentrating-surface.

ISAAC A. WOODBURY. [L. S.]

Witnesses:

J. DRAPER,
H. WEISSE.