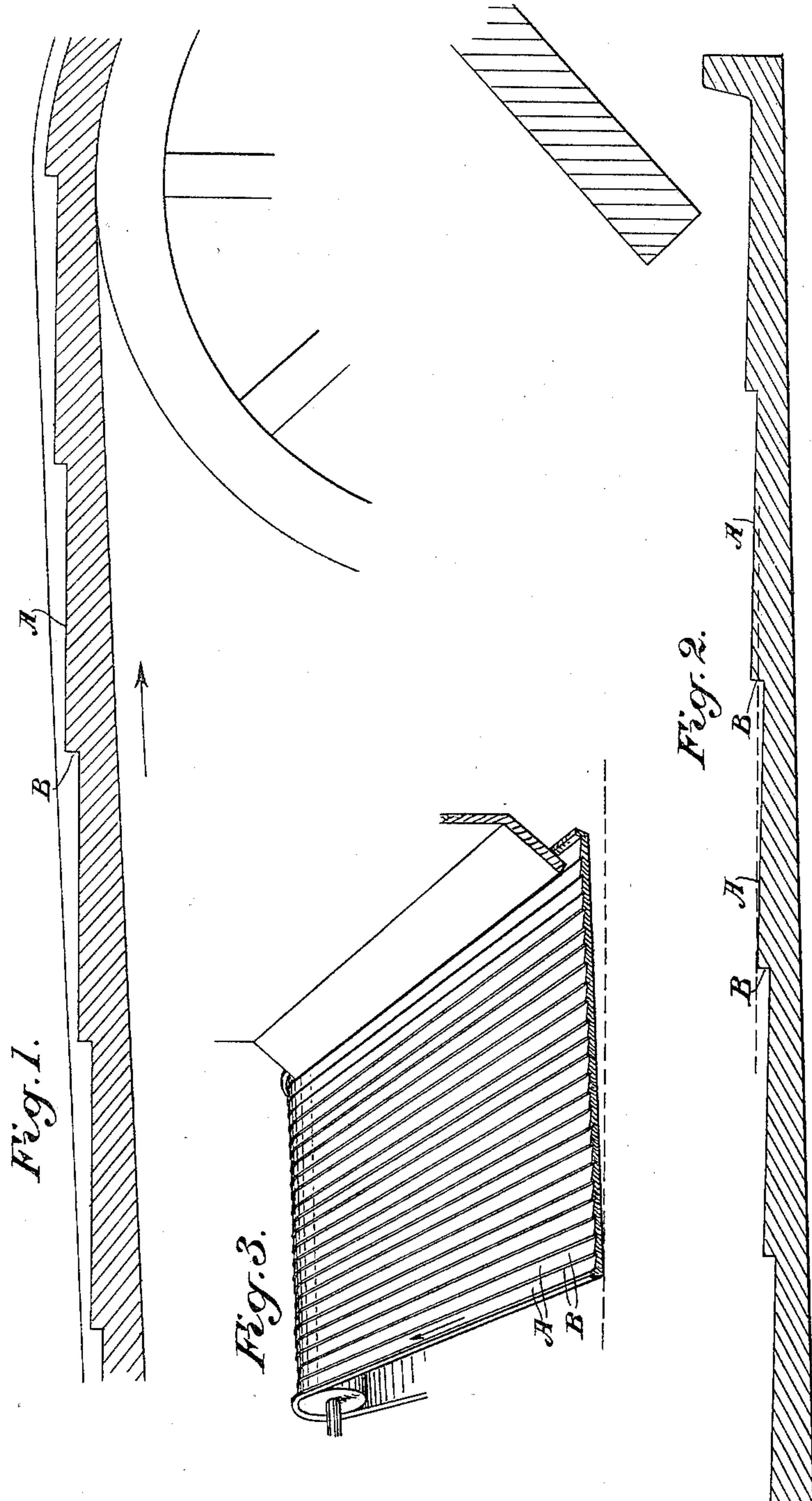


No. 626,461.

Patented June 6, 1899.

G. GATES.
CONCENTRATING BELT.
(Application filed July 8, 1897.)

(No Model.)



Witnesses,
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UNITED STATES PATENT OFFICE.

GEORGE GATES, OF JACKSON, CALIFORNIA.

CONCENTRATING-BELT.

SPECIFICATION forming part of Letters Patent No. 626,461, dated June 6, 1899.

Application filed July 8, 1897. Serial No. 643,860. (No model.)

To all whom it may concern:

Be it known that I, GEORGE GATES, a citizen of the United States, residing at Jackson, county of Amador, State of California, have
5 invented an Improvement in Concentrating-Belts; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device for concentrating valuable heavy materials; and it consists, essentially, in a novel construction and arrangement of an endless traveling belt, which will be more fully explained by reference to the accompanying drawings, in
15 which—

Figure 1 is a longitudinal section of a belt having the tables lateral. Fig. 2 is a cross-section of a belt having the tables running parallel with its travel. Fig. 3 shows a portion of a belt with longitudinal tables.
20

The object of my invention is to provide an endless traveling belt with a surface upon which a separation and concentration of heavy valuable substances from the lighter
25 slimes and worthless material can be accomplished more readily and the work of separation more closely effected than at present.

The belt is made of rubber. Such belts are usually made endless, passing over drums at
30 opposite ends, one of which is slightly lower than the other to allow the material delivered upon the belt to flow downward and having a mechanism by which the belt is slightly advanced against the flow of the current of material.
35

In the construction of my belt I form the surface in a series of tables A and offsets B, connecting the higher edge of each table with the lower edge of the next adjacent one, resembling in cross-section a series of shallow
40 offsets with long nearly horizontal intervening surfaces. These surfaces may be arranged either transversely or longitudinally. In the transverse arrangement the declination of the belt between the head or upper
45 roller and the one at the lower end is slightly less than the rise of the surfaces A from the base of each offset B to the top of the next one, thus giving the surfaces A a slight declination toward the head of the belt, or, in other
50 words, each surface A rises slightly above a horizontal plane from the base of the offset B

to the top of the next one, and if such a belt be agitated the tendency of the heavy material and sulfurets is first to settle upon the
55 surface A of the belt, and the constant agitation will cause these heavier portions to work backwardly or toward the bottom of the previous offset, against which the surface A abuts, while the lighter pulp and slimes will
60 continue to flow over the top of this heavier material, and dropping from one offset to the next it will gradually pass to the lower and discharge end of the belt. The sulfurets, which are exceedingly fine and considerably
65 heavier than this lighter pulp, will first be settled upon each tabular surface A, and as they gradually move on the surface to the foot of the preceding offset B they will form an approximately level or horizontal surface, being
70 deepest at the foot of the offset and becoming thinner until the final edge of termination of this deposit may be near the point where the slimes flow over the succeeding offset and onto the next table below. Thus the tabular sur-
75 faces A, while not being in themselves exactly horizontal, will be covered with a coating of the heavier sulfurets, which will so settle upon the tables as to produce a practically horizontal surface on each, over which
80 the slimes will flow and eventually be discharged at the lower end of the belt. As the belt travels up the grade and over the upper roller these sulfurets collected at the foot of each offset will be carried over the roller and
85 thence into a tank, which is designed to wash them off in the usual manner of washing the sulfurets which are collected upon the surface of the belt by other methods. The advantage of this construction is the avoidance
90 of all absolute grooves or channels and the retention of the sulfurets upon each of the tables, while the sulfurets themselves form a leveling-surface upon which the lighter materials will flow and discharge readily. When
95 the grooves are placed longitudinally on the belt, these longitudinal tabular surfaces A extend from one side toward the other of the belt and the offsets are parallel with the edges of the belt, thus extending in endless
100 lines around the belt. In this case I set the drums over which the belt passes as before, one of the drums being slightly higher than the other, so that anything delivered upon

the belt would naturally tend to flow down and eventually over the lower end of the belt; but in order to produce the separation desired the belt is also inclined from one side to the other by depressing the journals of the drums or rollers at one side, so that they are slightly lower than the journals upon the other. The belt-surface, if plain, would then have an inclination from one side to the other, and any material delivered upon this belt would flow gradually down the belt from the upper to the lower roller and at the same time diagonally on account of the tilt or inclination of the belt; but when the tabular surfaces A are used, as previously described, the tilt of the belt produces the same action that I have previously described when the tables and offsets extend transversely of the belt—that is, the edge of each table which is nearer to the highest edge of the belt is really a little lower than the discharge edge of the same table toward the opposite side of the belt—and this produces the following result:

The pulp is delivered by any suitable feeder along the higher edge of the belt with a sufficiency of water, and a shaking motion of the belt is produced by any suitable or well-known means adapted for that operation as connected with concentrator-belts.

The sulfurets will settle gradually to that side of the tables at the foot of each offset, the heaviest settling first upon the tables nearest to the feed edge of the belt and the finer and lighter settling successively upon the following tables until the very lightest of the material may be found near or beyond the middle of the belt. This material settles upon these tables, as previously described, so that it forms a wedge shape and approximately level surface transversely of the belt; but the inclination of the belt from the head to the discharge end is sufficient to cause this material in addition to its transverse movement of the belt to have a tendency to move down the belt as well, and this resultant motion causes the pulp to move diagonally from one side of the belt to the other.

As the belt is continually traveling upward and over the upper roller, it will be seen that in this case as well as the other the sulfurets which have settled and adhered to the belt-surface will be eventually carried over the upper roller, and passing into a water-tank through which the lower part of the belt passes and is submerged the sulfurets will be washed

off and the belt moves continuously around the rollers to continue the operation.

I have found in practice that a good working proportion is to make the surfaces A about two inches wide, the offsets B about three thirty-seconds high, and when the belt is inclined from one side to the other, the belt being about four feet wide, to make the total inclination approximately three-fourths of an inch. The proportions may be relatively similar when the surfaces A are transverse. By this construction I am enabled to save the sulfurets and heavier valuable portions to an almost perfect degree.

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

1. An endless traveling-belt having a regular general inclination so that pulp delivered at the upper end will flow toward the lower end, broad flat tabular surfaces upon the top of the belt with intervening offsets, each of said surfaces declining toward the higher end of the belt and to the foot of the next offset whereby extended surfaces are formed for the settling of sulfurets and to allow pulp to flow over the surface of the sulfurets thus deposited.

2. An endless longitudinally-inclined belt composed of a series of wide longitudinally-disposed surfaces with shallow vertical connecting-offsets, drums around which the belt is movable both drums so inclined from end to end, that the belt-surfaces have a slight downward inclination transversely from the lower toward the upper edge of the belt, and a means for supplying pulp and water along the upper edge of the belt.

3. An endless longitudinally-inclined belt, composed of a series of wide longitudinally-disposed surfaces with short vertical connecting-offsets, and having upturned flanges at its edges, drums around which the belt is movable, both drums being inclined transversely of the belt, so as to produce a general flow of pulp from the upper side and end, while the belt-surfaces decline from the lower toward the upper side.

In witness whereof I have hereunto set my hand.

GEORGE GATES.

Witnesses:

JESSIE C. BRODIE,
S. H. NOURSE.