

No. 743,871.

PATENTED NOV. 10, 1903.

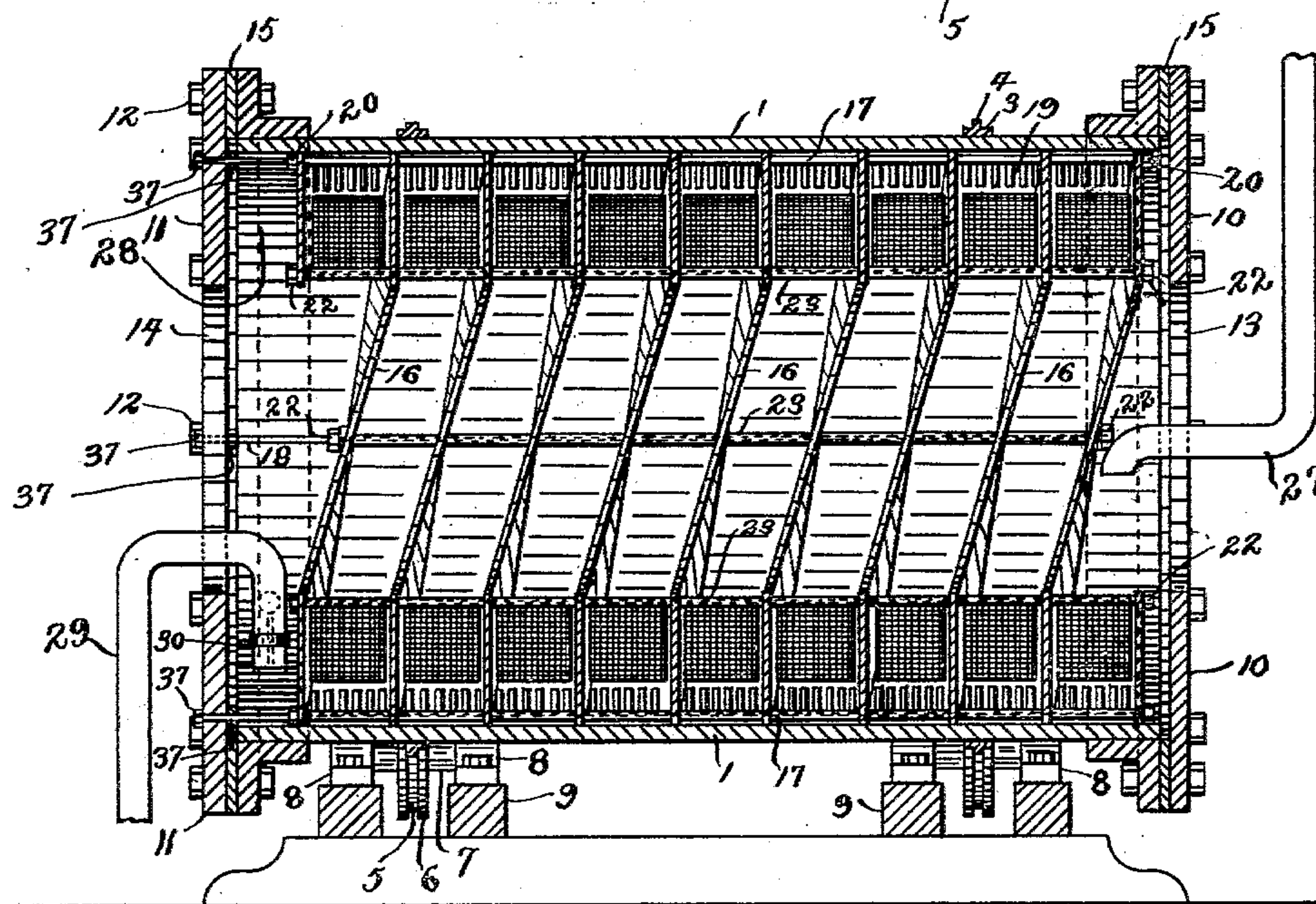
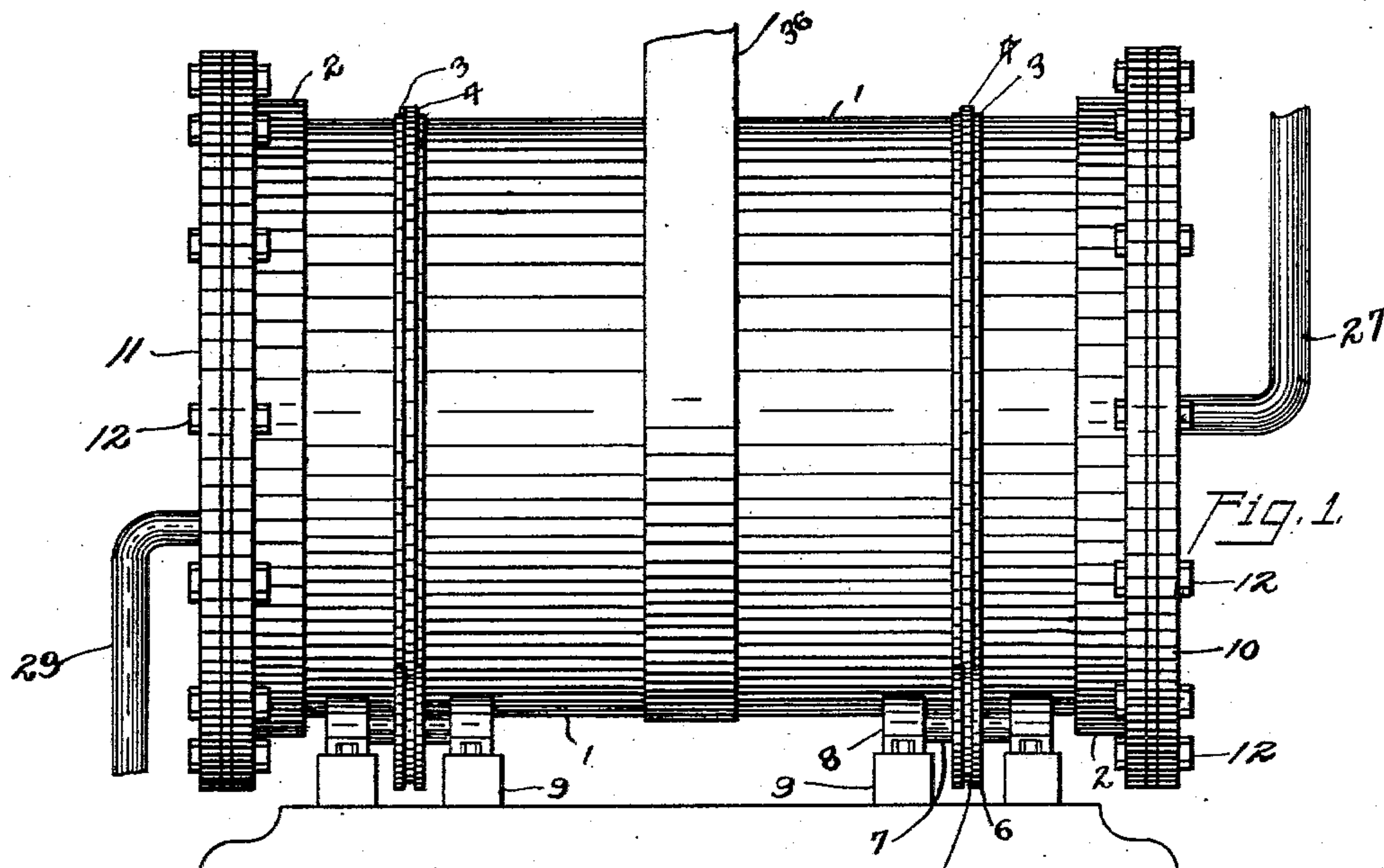
H. HOESCHEN, G. MARKS & H. EISELE.

AMALGAMATOR.

APPLICATION FILED JUNE 13, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

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Fig. 2. Henry Hoeschen
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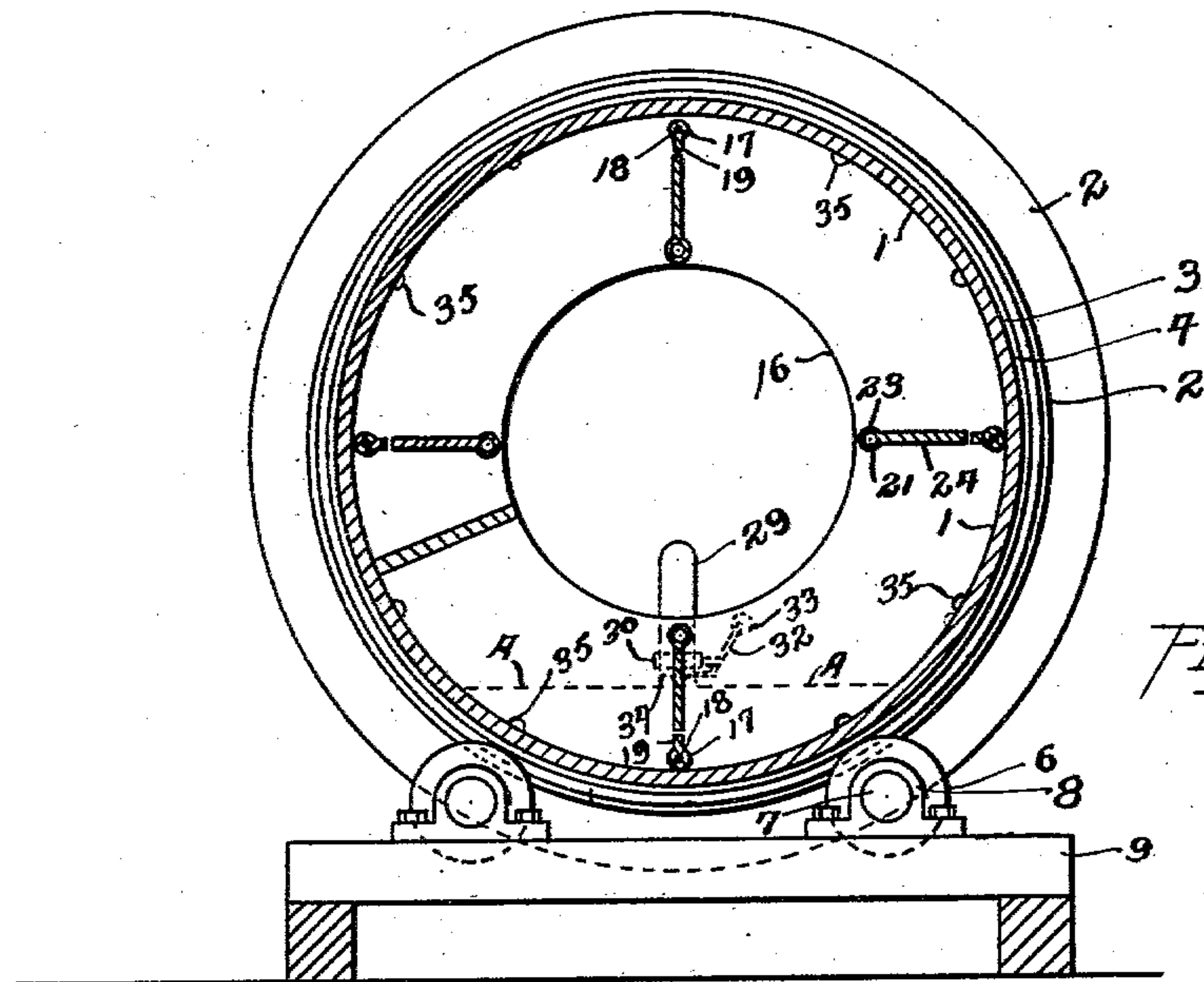


Fig. 3.

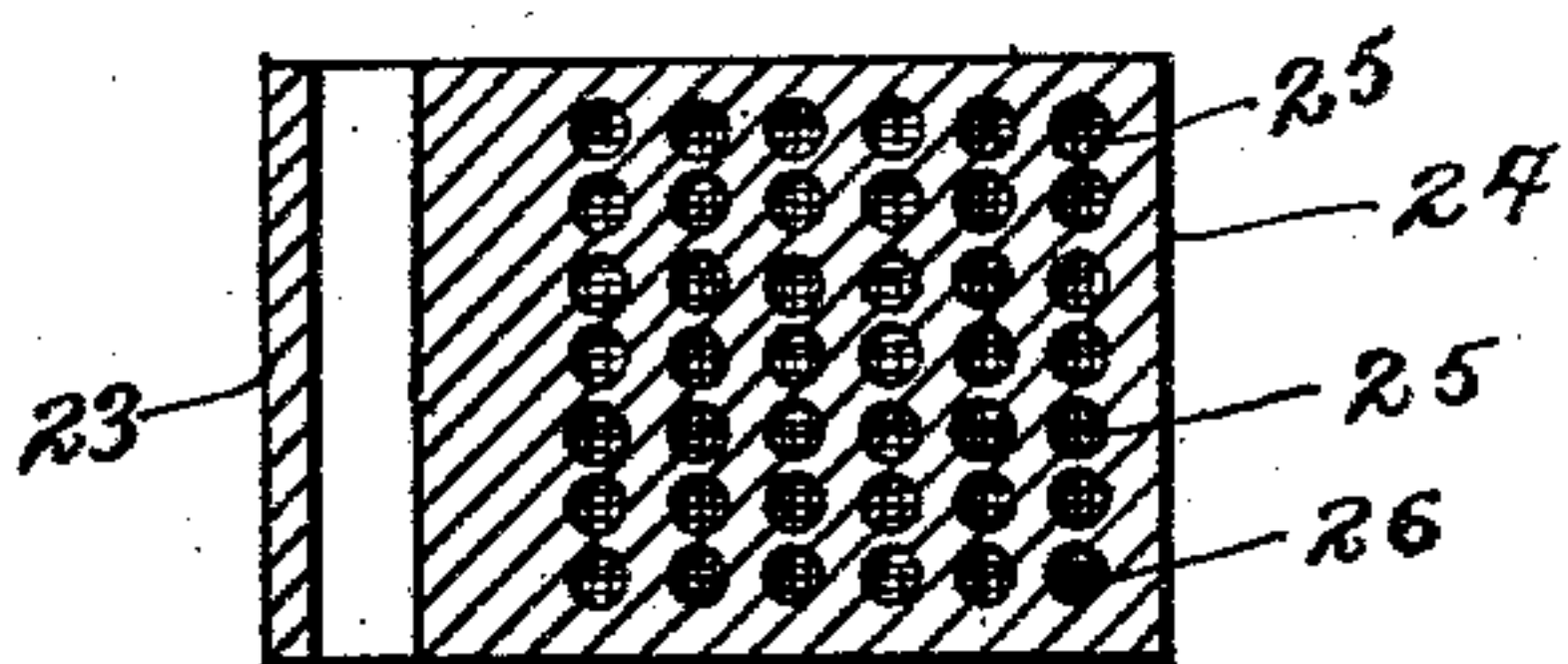


Fig. 4.

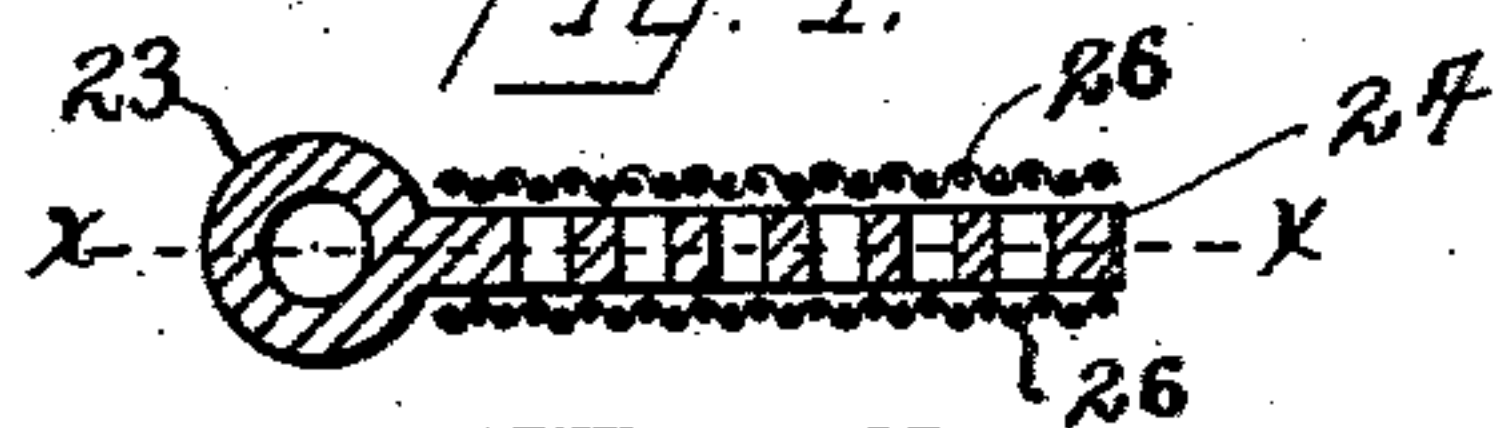


Fig. 5.

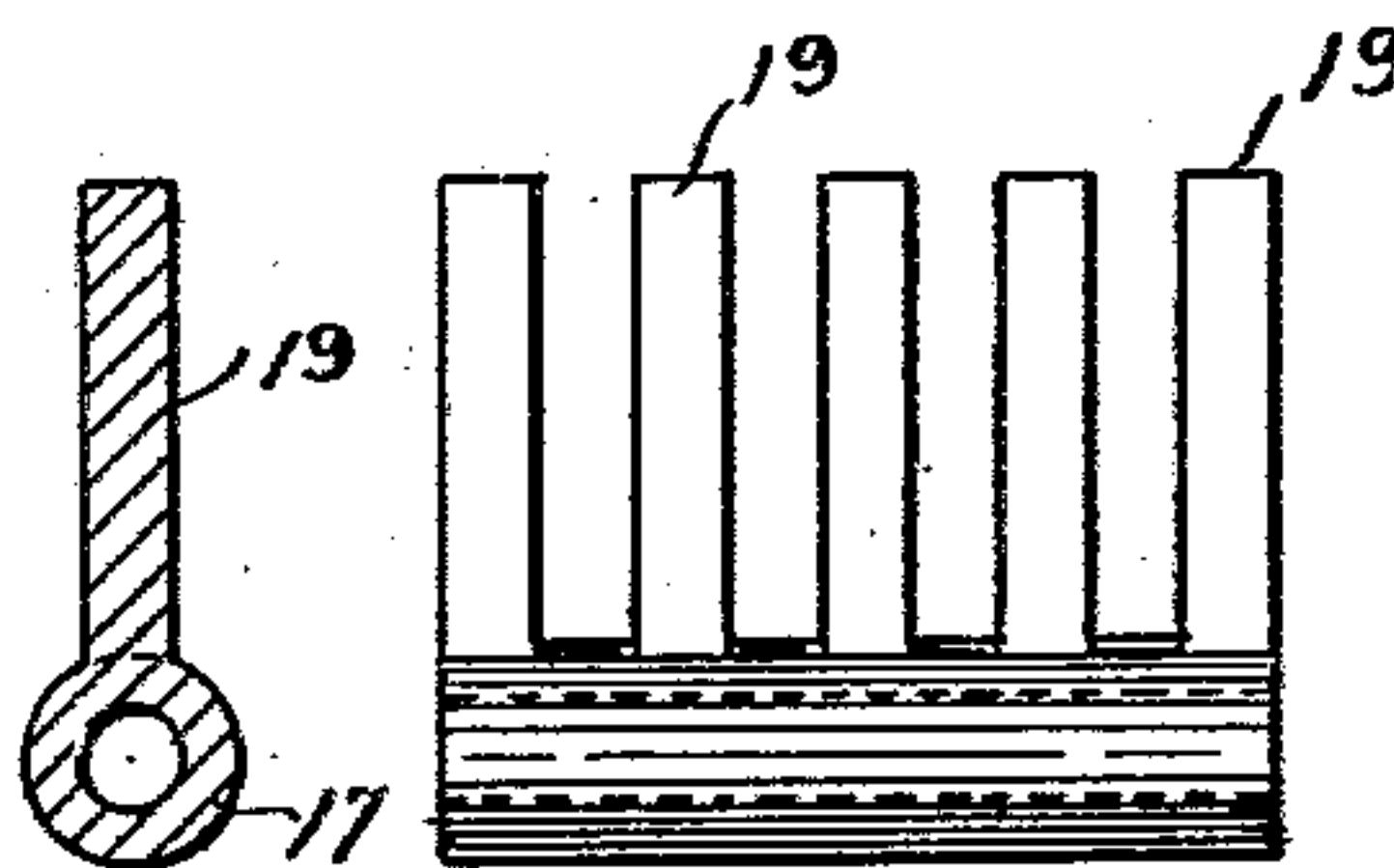


Fig. 6.

Fig. 7.

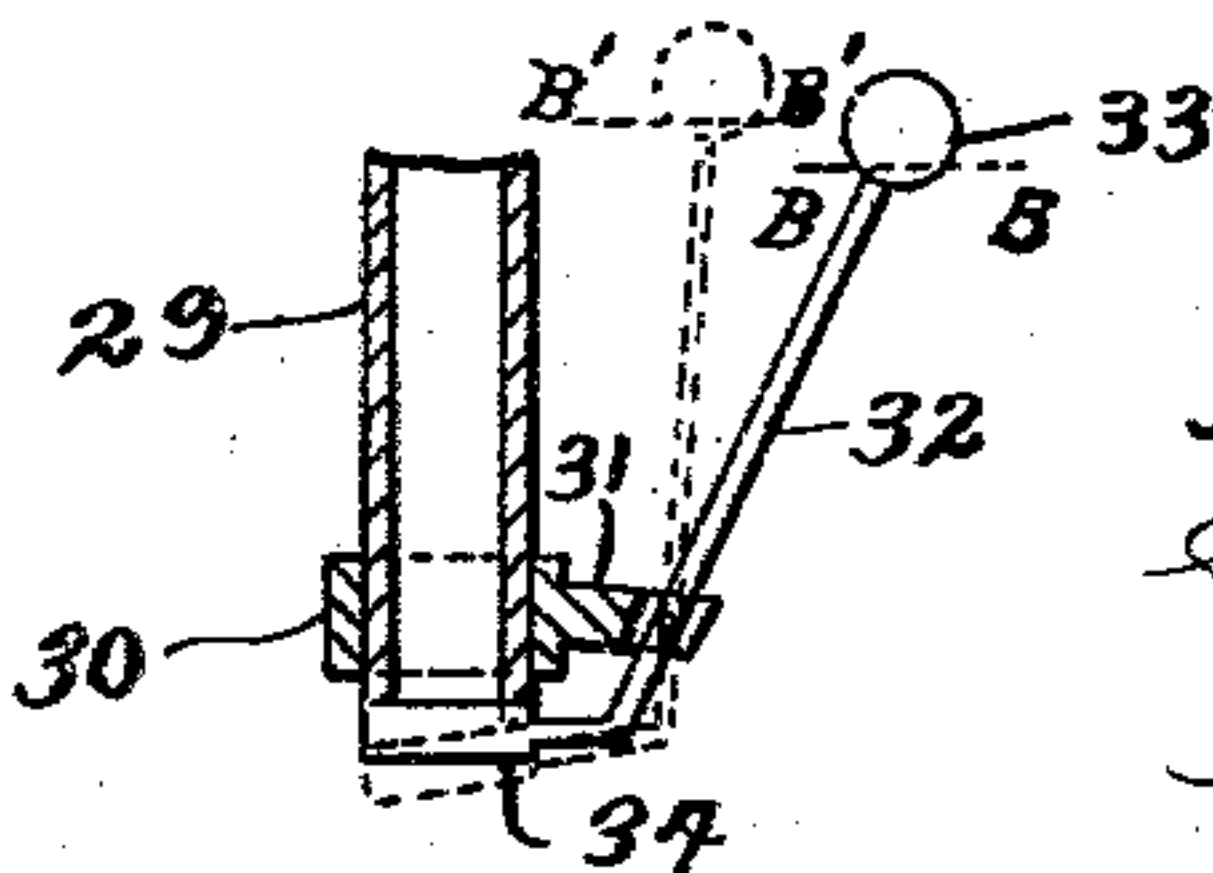


Fig. 8.

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UNITED STATES PATENT OFFICE.

HENRY HOESCHEN, GEORGE MARKS, AND HIERONYMUS EISELE, OF OMAHA,
NEBRASKA.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 743,871, dated November 10, 1903.

Application filed June 13, 1902. Serial No. 111,511 (No model.)

To all whom it may concern:

Be it known that we, HENRY HOESCHEN, GEORGE MARKS, and HIERONYMUS EISELE, citizens of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Amalgamators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to amalgamators for recovering amalgamable metals from ores containing the same.

It is the object of our invention to provide an amalgamating mechanism for use with ores of the above type which shall have a large amalgamating-surface contained in a small space, which shall thoroughly intermingle the ore-pulp and the mercury used for amalgamation, constantly receive fresh pulp and work off the exhausted pulp, provide a large containing-space for the amalgam, and when used with gold-bearing ores to recover the values usually lost in the finely-divided so-called "flour-gold."

Our invention consists in the combinations and arrangements of the conveying devices for moving the pulp through the amalgamator, the means for removing the exhausted pulp and automatically controlling the removal, the means intermingling the pulp and the mercury for collecting and causing the amalgamation of the finer particles of metal, and in certain other combinations and arrangements of parts more fully set forth hereinafter.

The accompanying drawings show an amalgamator embodying our invention.

Figure 1 is a side elevation of the device. Fig. 2 is a longitudinal section of the same. Fig. 3 is a transverse sectional view. Fig. 4 is a detail section of one of the collecting and agitating blades, the section being taken on the line *x x* of Fig. 5. Fig. 5 is a transverse section of one of the collecting and agitating blades. Fig. 6 is a transverse section of one of the mixing-paddles. Fig. 7 is a side elevation of the same. Fig. 8 is a detail end elevation and section of the controlling-valve of the discharge-pipe.

In the construction shown a cylinder 1 of suitable dimensions has the flanged rings 2 2 shrunk onto the ends thereof. Between the rings 2 2 are other rings 3 3, having the projecting tongues 4 4 thereon. The said tongues fit into grooves 5 in the antifriction-wheels 6 on the shafts 7, which are journaled in suitable bearings 8 on a frame 9. The cylinder is thus rotatably held in a substantially horizontal position. The ends of the cylinder are partly closed by the plates 10 and 11, secured to the flanged rings 2 2 by bolts 12. The plates 10 and 11 have annular openings in the center thereof, the said openings being of approximately the proportions shown. Between the said plates and the rings are placed the gaskets 15, as shown. Material is conveyed through the cylinder and a large amalgamating-surface provided by means of the spiral plate 16 in the cylinder, the outer edges of which spiral plate fit closely to the inside of the cylinder except at the small openings 35. (Indicated in Fig. 3.) The said spiral plate is made of copper or other material having an affinity for mercury, and the cylinder is made of or lined with similar material. The convolutions of the spiral plate are held in proper relative position and also secured to the plate 11 by means of the shafts 18, passing longitudinally through the convolutions and into the plate 11. Between each of the convolutions of the spiral plate the said shafts 18 pass through the shanks of the mixing-paddles 17. Outside the end convolutions are nuts 20, which when tightened press the paddles and the various convolutions together and bind the same, so that they are securely held in their relative positions.

While the fingers 19 of the mixing-paddles are shown extending radially to the cylinder, the same may be set at any other angle desired by loosening the nuts 20, turning the paddles to the position desired, and again tightening the nuts.

Between the end convolution of the spiral plate and the plate 11 is the settling-chamber 28, which is not crossed by the spiral plate. The shafts 18 extend across the said chamber and pass through the plate 11, being secured thereto by nuts 37, as shown.

Thus when the said plate is removed the spiral plate is pulled out of the cylinder therewith.

Passing through the inner edges of the spiral plate and coinciding radially to the cylinder with the shafts 18 are shafts 21, having on the ends thereof the nuts 22, adapted to be tightened to hold in position the agitating and collecting blades 24. The said shafts 21 pass through the shanks 23 of the blades 24, which may be turned and adjusted to any desired position by loosening the nuts 22, turning the blades to the position desired, and again tightening the nuts, the operation being similar to that for adjusting the paddles 17. The body portions of the blades 24 have perforations 25 therein and are covered by cloth or fabric 26, as indicated in Figs. 1 and 5.

Passing through the opening 14 in the plate 11 is a pipe 29, which turns downward into the settling-chamber 28. Near the lower end of the pipe is a collar 30, secured thereto and having a lug 31 thereon on which is pivoted an arm 32, as indicated in Fig. 8. On the upper end of the arm 32 is a float 33. The lower end of the said arm carries a disk 34, adapted to close the end of the pipe 29 when the float 33 is in the lower position indicated in Fig. 8 or to leave the end of the pipe open when the float is in the raised position indicated in dotted lines in the said figure.

The operation of the amalgamator is as follows: The cylinder being in the position indicated, the same is filled with mercury to approximately the level of the dotted line A A in Fig. 3 and rotated by means of the belt 36 passing around the same, as shown in Fig. 1. Water and ore-pulp are then fed into the cylinder through the pipe 27. The pulp is carried through the cylinder by the spiral plate rotating with the cylinder, and during the passage of the pulp through the cylinder it is repeatedly caught by the mixing-paddles 17, forced down into the mercury, lifted, dropped, and otherwise brought into intimate contact with the mercury and amalgamating-surfaces. The mixing and agitating of the mercury and pulp are assisted by the blades 24; but the special purpose of these blades is to collect, by means of the fabric covering thereon, the finer particles of metal and then force the said particles down into the mercury to cause their amalgamation. When the material reaches the end of the cylinder nearest to the plate 11, it enters the settling-chamber 28, where, the agitation and mixing ceasing, the fine particles and beads of mercury settle down into the main body of the mercury. The exhausted pulp is removed by means of the pipe 29, which may act as a siphon or be attached to a pump, as desired. The removal of the exhausted pulp is automatically controlled by the valve-disk 34, which opens the end of the pipe 29 when the water and pulp raise the float 33 and

closes the end of the pipe when the water and pulp permit the float to drop down.

The body of mercury is prevented from accumulating in the settling-chamber 28 by the small openings 35 around the outer edges of the spiral plate, which openings permit the mercury to flow through the same and remain at substantially the same level throughout the cylinder.

It is obvious that by the described means the ore-pulp will be thoroughly intermingled with the mercury and brought into contact with the amalgamating-surfaces, so that every opportunity is given the particles of metal to amalgamate with the mercury either in the main body thereof or on the amalgamating-surfaces provided by the spiral plate and the inner surface of the cylinder.

Now, having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. An amalgamator comprising a rotatable cylinder, an internal spiral amalgamating and conveying plate carried by the cylinder and rotatable therewith, mixing-paddles and collecting-blades adjustably held between the convolutions of the spiral plate, a settling-chamber formed at one end of the cylinder, means for rotating the cylinder, means for feeding pulp into the cylinder, means for removing the exhausted pulp from the settling-chamber, and means automatically controlling said removal, substantially as described.

2. An amalgamator comprising a rotatable cylinder, plates partly covering the ends thereof, central openings in the said plates, a spiral plate in the cylinder and rotatable therewith, shafts passing through the convolutions of said spiral plate and attaching the same to one of the end plates, mixing-paddles carried by the said shafts, perforated fabric-covered collecting-blades carried by other shafts passing through the convolutions of the spiral plate, a settling-chamber and means for feeding pulp into the cylinder and removing the exhausted pulp therefrom, substantially as described.

3. In an amalgamator, the combination with a rotatable cylinder of plates partly covering the ends of said cylinder, a spiral amalgamating and conveying plate in the said cylinder and secured to the end plates thereof, shafts passing through the convolutions of the spiral plate longitudinally with the cylinder, mixing-paddles carried by some of said shafts, perforated fabric-covered collecting-blades carried by other of said shafts, a settling-chamber at one end of the cylinder and means for removing exhausted pulp therefrom, substantially as described.

4. In an amalgamator, the combination with a rotatable cylinder of a spiral amalgamating and conveying plate in said cylinder and rotatable therewith, mixing-paddles and collecting-blades adjustably held between the con-

volutions of the spiral plate, a settling-chamber at one end of the cylinder, and means for removing pulp from said settling-chamber and for automatically controlling said removal, substantially as described.

5 5. In an amalgamator, a substantially horizontal cylinder having the outer portion of the ends thereof closed, tongued rings on said cylinder, grooved antifriction-wheels engaging said tongued rings for supporting and rotatably holding the cylinder, a spiral amalgamating and conveying plate in the said cylinder and adapted to be rotated therewith, a settling-chamber at one end of the cylinder,
10 a pipe entering the same, a valve connected with said pipe, and a float adapted to operate the valve to open or close the end of the pipe, substantially as described.

15 6. In an amalgamator, the combination with a substantially horizontal cylinder of a means for rotatably supporting the cylinder, means

for rotating the cylinder, a spiral amalgamating and conveying plate within the cylinder, plates covering the outer portion of the ends of the cylinder, and adapting the same to contain a quantity of mercury, shafts connecting the spiral plate to one of the end plates, mixing-paddles adjustably held by said shafts between the convolutions of the spiral plate, openings in the outer edges of the spiral plate for permitting the mercury to flow through the same, and a settling-chamber for effecting the separation of pulp and mercury, substantially as shown and described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

HENRY HOESCHEN.

GEORGE MARKS.

HIERONYMUS EISELE.

Witnesses:

D. O. BARNELL,

HARRY S. SMITH.