No. 793,552. PATENTED JUNE 27, 1905.

L. TREUHEIT.

APPARATUS FOR MANUFACTURING SEGMENTS FOR USE IN THE CONSTRUCTION OF TUNNELS OR SHAFTS.

APPLICATION FILED SEPT. 19, 1904.

3 SHEETS—SHEET 1.

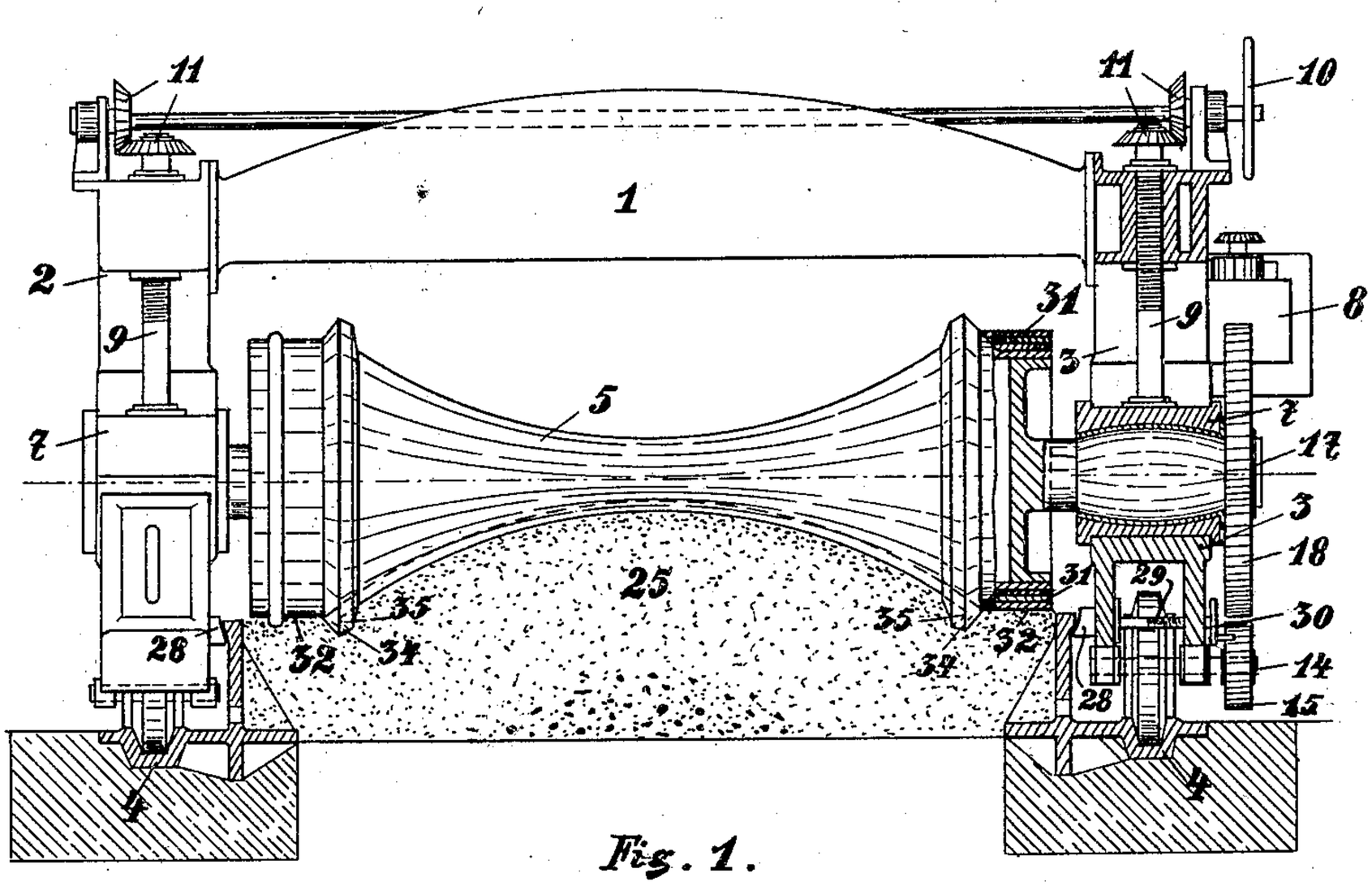

Fig. 1.

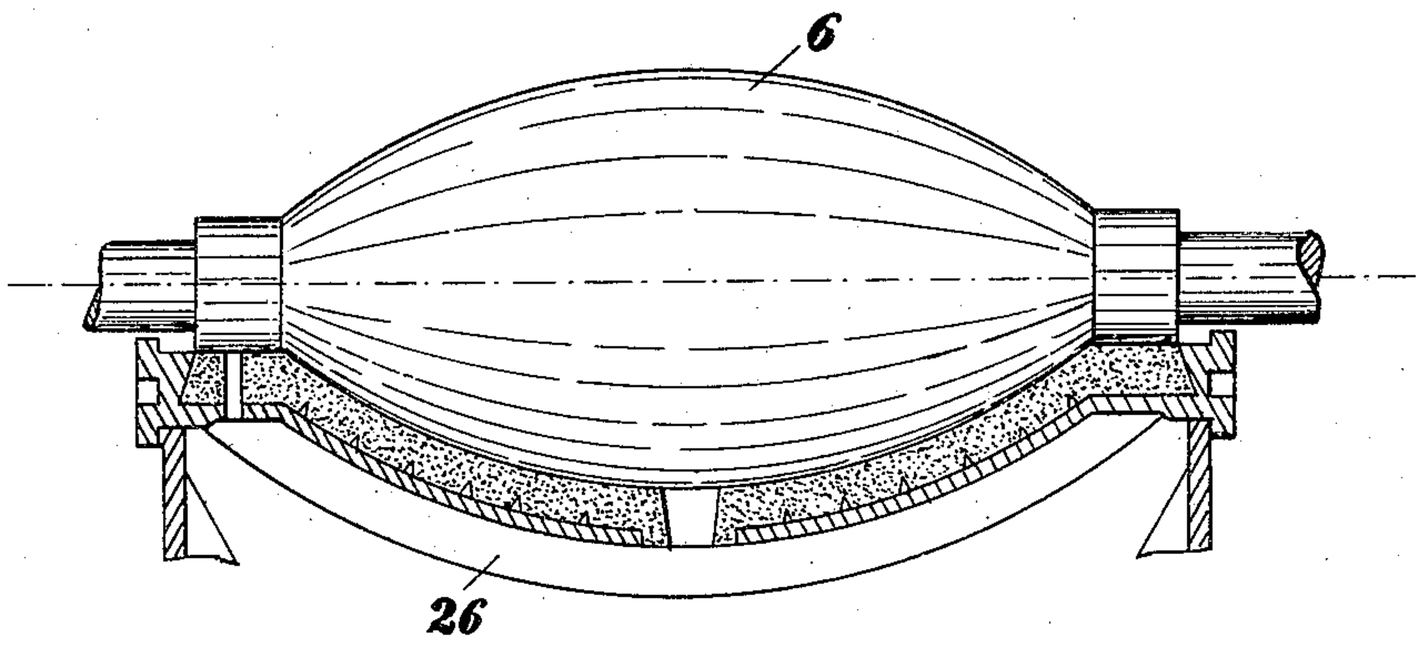

Fig. 3.

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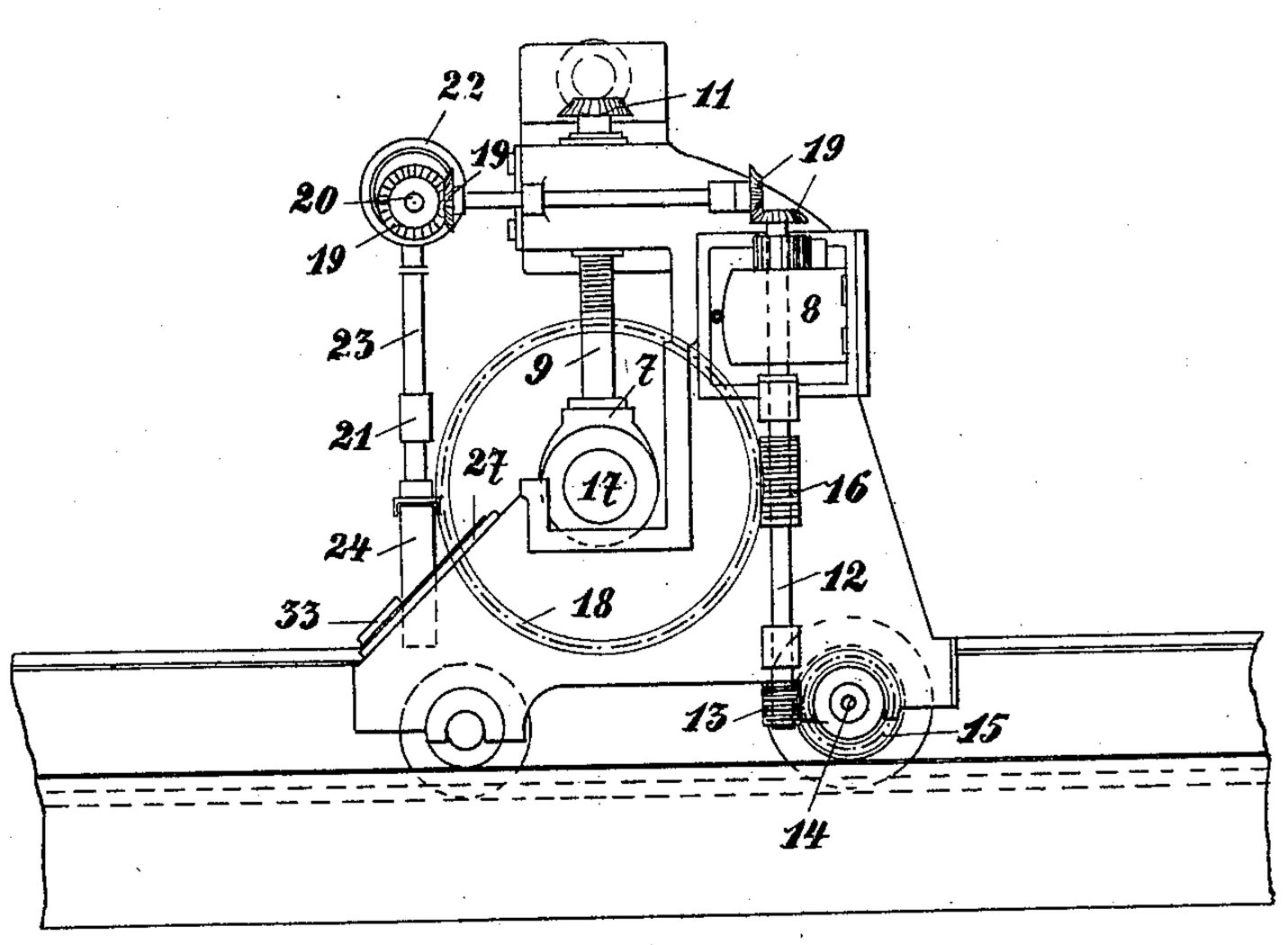
8 SHEETS—SHEET 2.

Fig. 2.



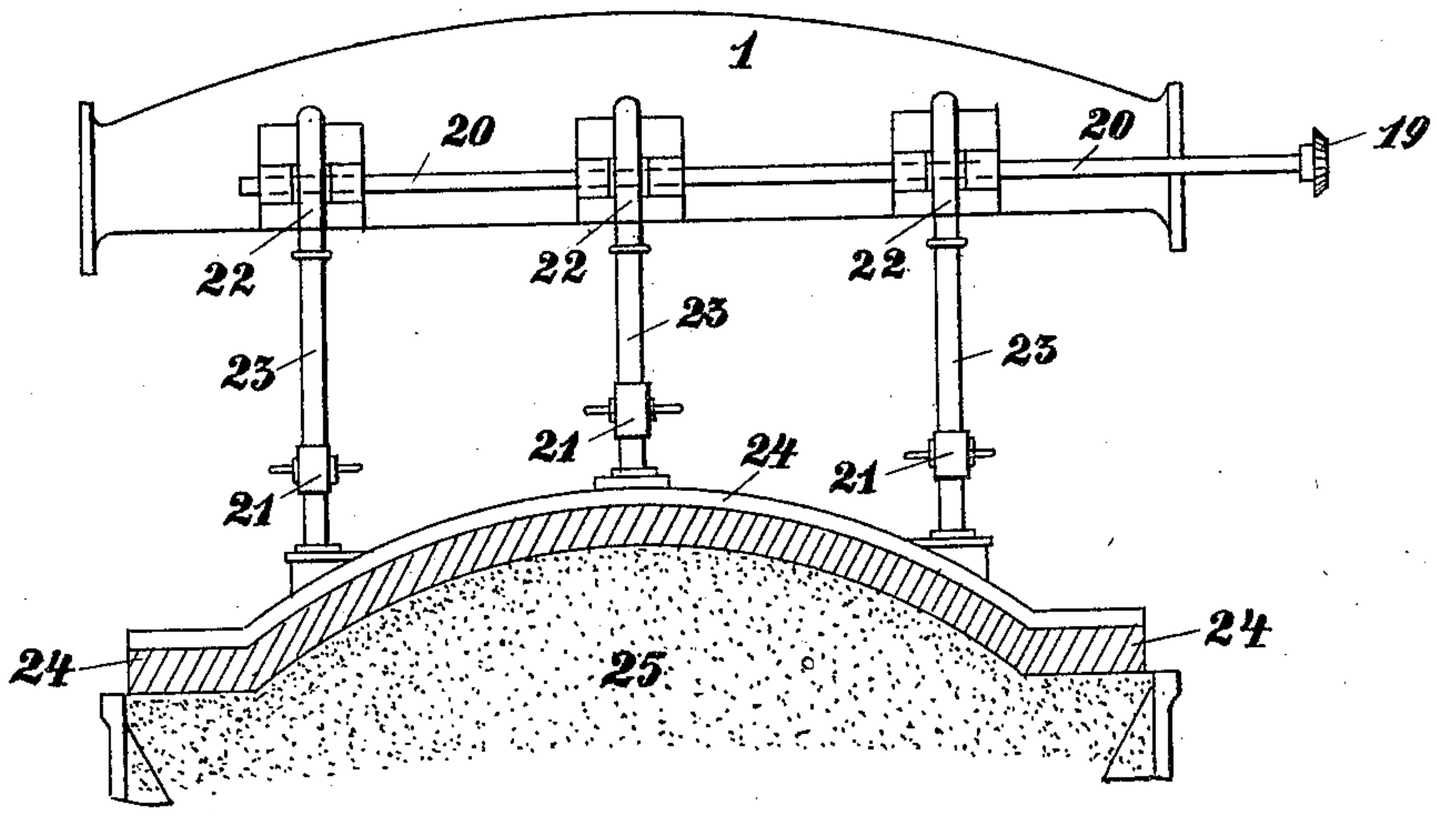


Fig. 4.

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8 SHEETS—SHEET 3.

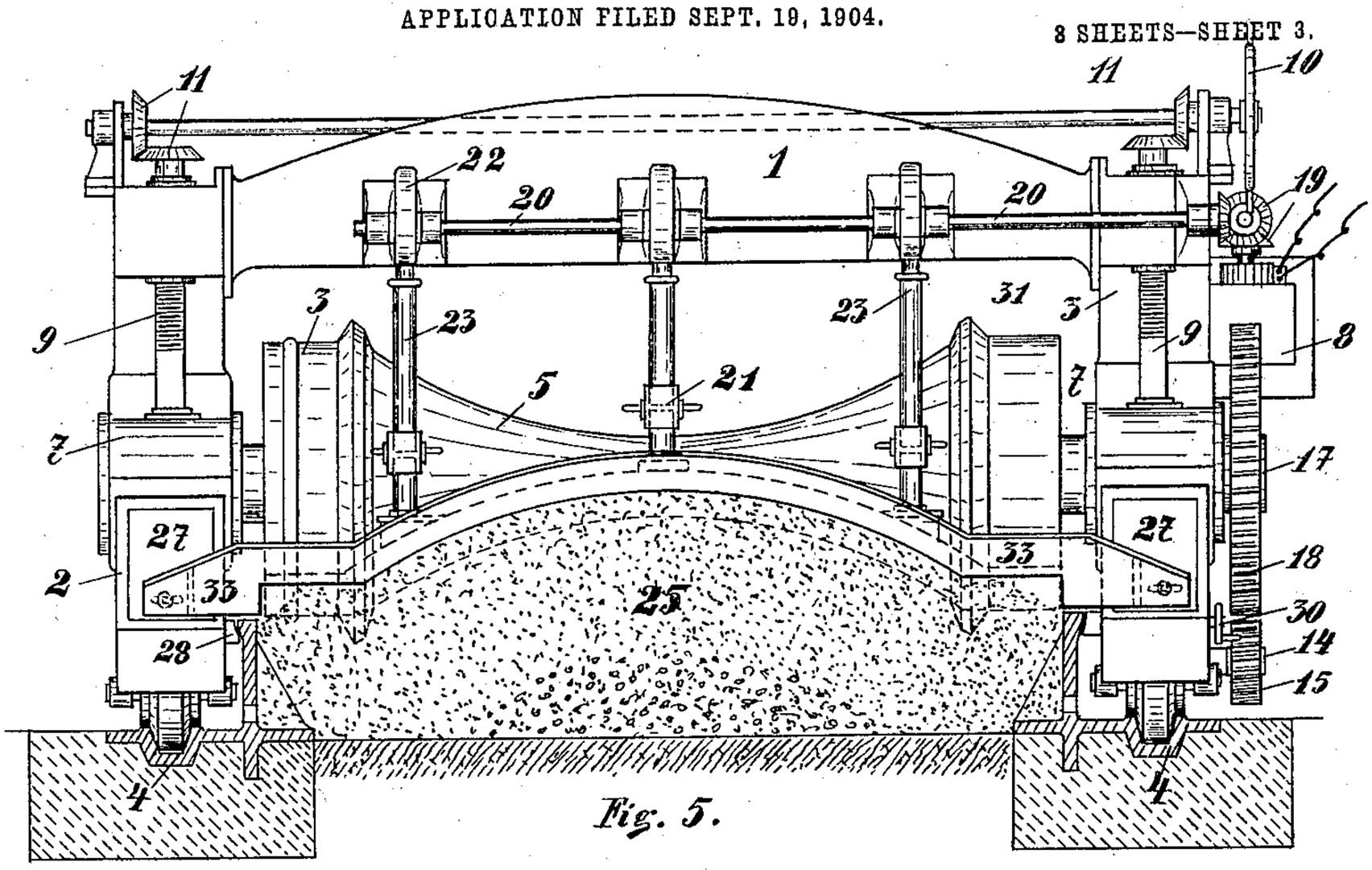

Fig. 5.

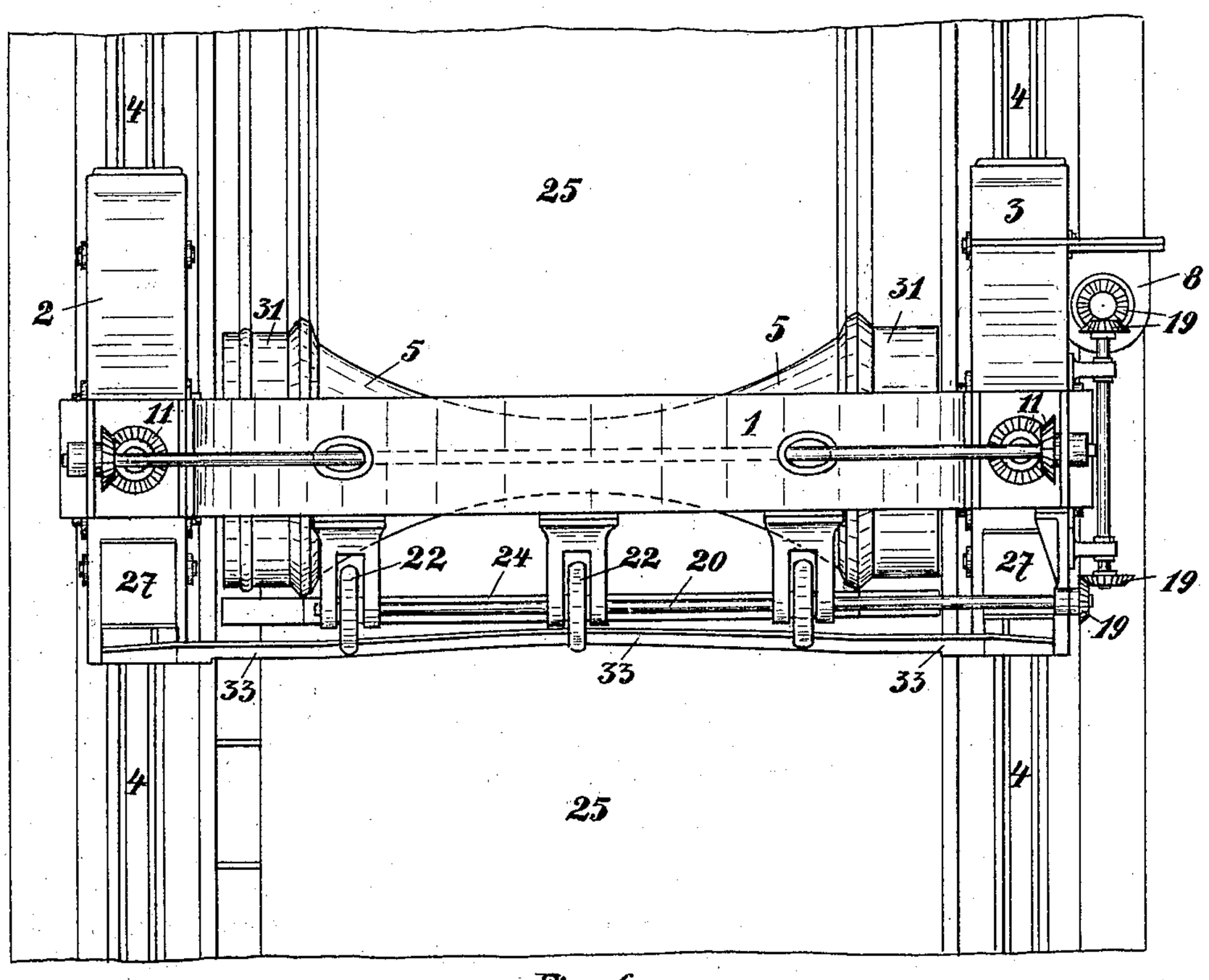

Fig. 6.

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No. 793,552. Patented June 27, 1905.

UNITED STATES PATENT OFFICE.

LEONHARD TREUHEIT, OF DÜSSELDORF, GERMANY.

APPARATUS FOR MANUFACTURING SEGMENTS FOR USE IN THE CONSTRUCTION OF TUNNELS OR SHAFTS.

SPECIFICATION forming part of Letters Patent No. 793,552, dated June 27, 1905.

Application filed September 19, 1904. Serial No. 225,085.

To all whom it may concern:

Be it known that I, LEONHARD TREUHEIT, a subject of the German Emperor, residing at Simrockstrasse 56, Düsseldorf, Germany, have invented certain new and useful Improvements in Apparatus for Manufacturing Segments to be used in the Construction of Tunnels or Shafts, of which the following is a full, clear, and exact description.

The present invention relates to an apparatus for forming mechanically and without the manual labor usually employed molds for casting segments which can be used in the construction of tunnels and shafts in mines or for underground railroads.

In the accompanying drawings, forming part of this specification, Figure 1 is a front elevation of the apparatus, partly in section, the molding-board and rammer being omitted to show clearly the molding-roller and the bed. Fig. 2 is a side elevation. Fig. 3 shows in section the top segment inverted with the molding-roller in elevation. Fig. 4 is a front elevation of the ramming device. Fig. 5 is a front elevation of the machine similar to Fig. 1, but with the molding-board and rammer; and Fig. 6 is a plan view of the machine, Fig. 5, with the molded bed.

The apparatus is composed of two iron upright frames, being connected at the top by a bridging 1, said frame 2 3 being arranged on wheels running in grooves of rails 4. The frames 2 3 are each provided with a device by which the bearings 7, carrying the roller 5 or 6, may be adjusted vertically, so as to place the roller 5 more or less high over the bed of sand. An electromotor 8 on the frames serves to actuate a ramming device secured to the bridge 1 and to move the apparatus to and fro upon the rails 4 simultaneously.

The device for adjusting the bearings 7, supporting the rollers 5 or 6, consists of the screw-rods 9, which are rotated by a hand-wheel 10 and bevel-gears 11, as is easily understood from the drawings.

The mechanism for moving the molding-machine backward and forward consists, essentially, of the motor 8, which is projecting laterally from the upright 3, and of a shaft 12, carrying at its lower end a worm 13, gearing into the worm-wheel 15 on the rear axle 14. A second worm 16 on the shaft 12 of the motor engages the teeth of a worm-wheel 18, keyed upon the axle 17 of the rollers, and thus rotates the rollers while the machine is traveling over the bed of sand. The ramming device secured to the bridging 1 in front of the roller 5 is likewise operated by the motor 8 by means of bevel-wheels 19 and a shaft 20, carrying a number of eccentrics, as shown, or of cranks, cams, or similar suitable lifting elements. Eccentric-straps 22 around the eccentrics on the shaft 20 and rods 23 connect the rammer 24 with the shaft 20, and suitable connections 21 are used on the rods 23 to adjust the rammer in convenient height above the bed. The rammer 24 corresponds in form to the bed of sand 25 and to the top flask 26.

Adjustable mold-board carriers 27 are fitted to the frames 2 and 3 and carry the mold-board 33, conforming to the outline of the bed to be shaped. To insure a smooth running of the machine over the bed, running sliding pieces 28 project from the frames 2 and 3 inwardly and on one side may be made adjustable by means of a screw 29 and a hand-wheel 30. The thickness of the sections to be cast is regulated by rings 31, which can be pushed on both ends of the rollers, whereby by the employment of a thick ring, for example, thin segments are produced, owing to the seats 32, which remain at both sides of the bed of sand 25 when rolled and on which the top flask rests, being thus made correspondingly deeper. Reversedly, by putting thin rings on thicker segments are formed.

The apparatus works in the following manner: The long bed of sand 25, composed of fireproof material formed in the usual manner between the rails, is at first correspondingly shaped by the mold-board 33. Directly behind this mold-board the rammer 24, having a correspondingly-rounded shape, acts upon the sand during its vertical reciprocation, whereupon the roller 5 of a profile similar to the segment presses the bed down and produces a smooth surface. To form the top segment 26, the roller 5 is removed and an egg-shaped roller 6, Fig. 3, is placed

in the apparatus and the machine is guided over the mass, forming the top segment, which when ready is turned and placed upon the ready bed 25. The inward edge in the profile of the flange, joints of the sections which cannot be produced by the process of rolling, is formed by hand, and a division of the segments is effected by suitable cores placed on the bed. When the mold is finished, the top flasks are turned, placed on the bed of sand, and the casting may begin.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Apparatus for manufacturing segments to be used in the construction of tunnels and shafts, composed of a frame having on the sides mold-board carriers for securing thereto the ends of a mold-board, and having a rammer of the proper cross-section suspended on a shaft provided with means to communicate to the rammer a vertical reciprocating motion and having a convex roller in adjustable bearings, to roll and even the bedding.

2. Apparatus for manufacturing segments to be used in the construction of tunnels and shafts, composed of a frame having on the sides mold-board carriers for securing thereto the ends of a mold-board, and having a rammer of the proper cross-section suspended on a shaft provided with means to communicate to the rammer a vertical reciprocating motion and having a convex roller in adjustable bearings, said bearings being adapted to receive an egg-shaped roller in place of the convex roller, substantially as described.

In testimony whereof I affix my signature.

LEONHARD TREUHEIT.

In presence of—

PETER LIEBER,

OSKAR KÜNZELL.