

E. B. RAVENCROFT.
CONCRETE MIXER.
APPLICATION FILED JUNE 5, 1908.

907,284.

Patented Dec. 22, 1908.

2 SHEETS—SHEET 1.

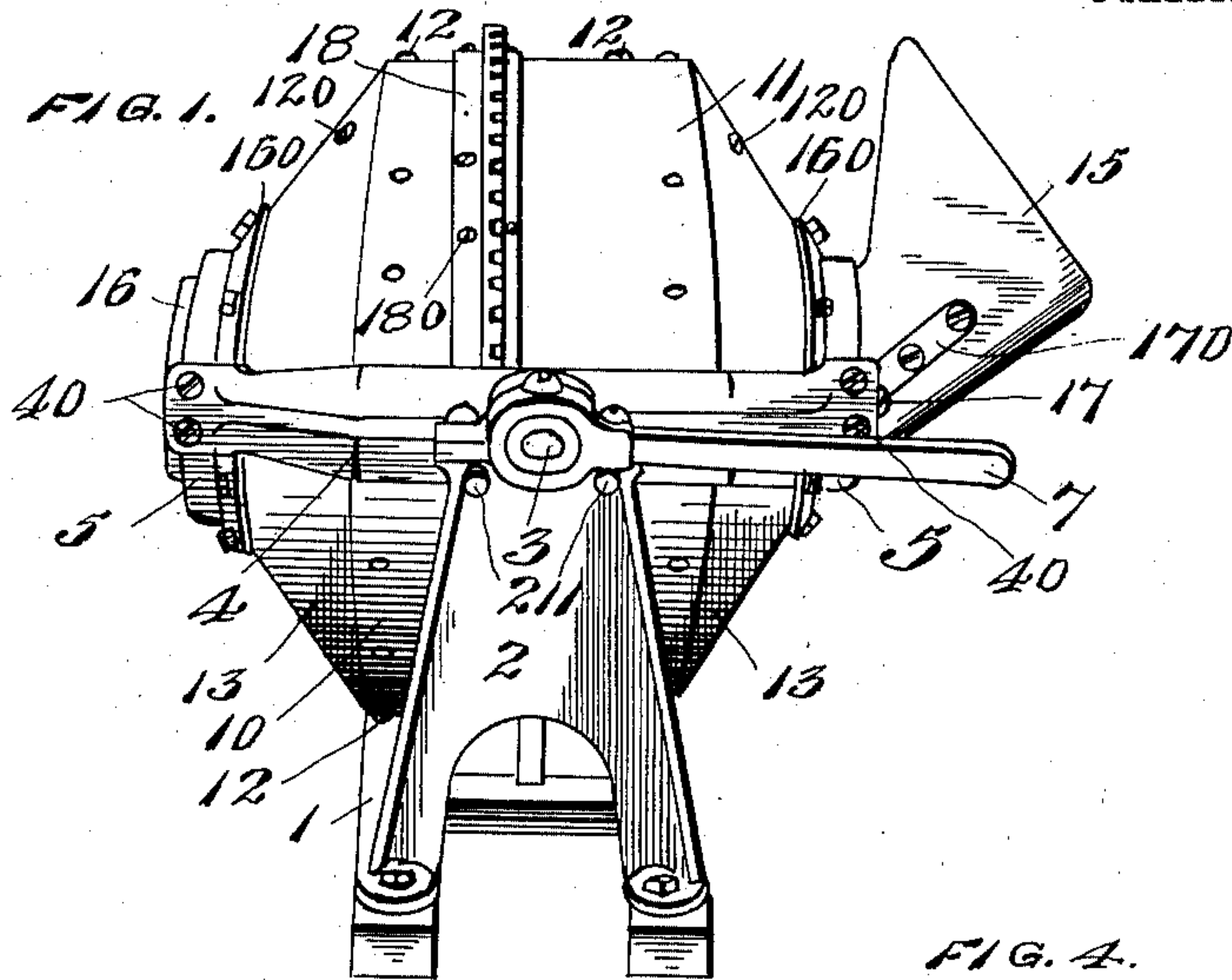
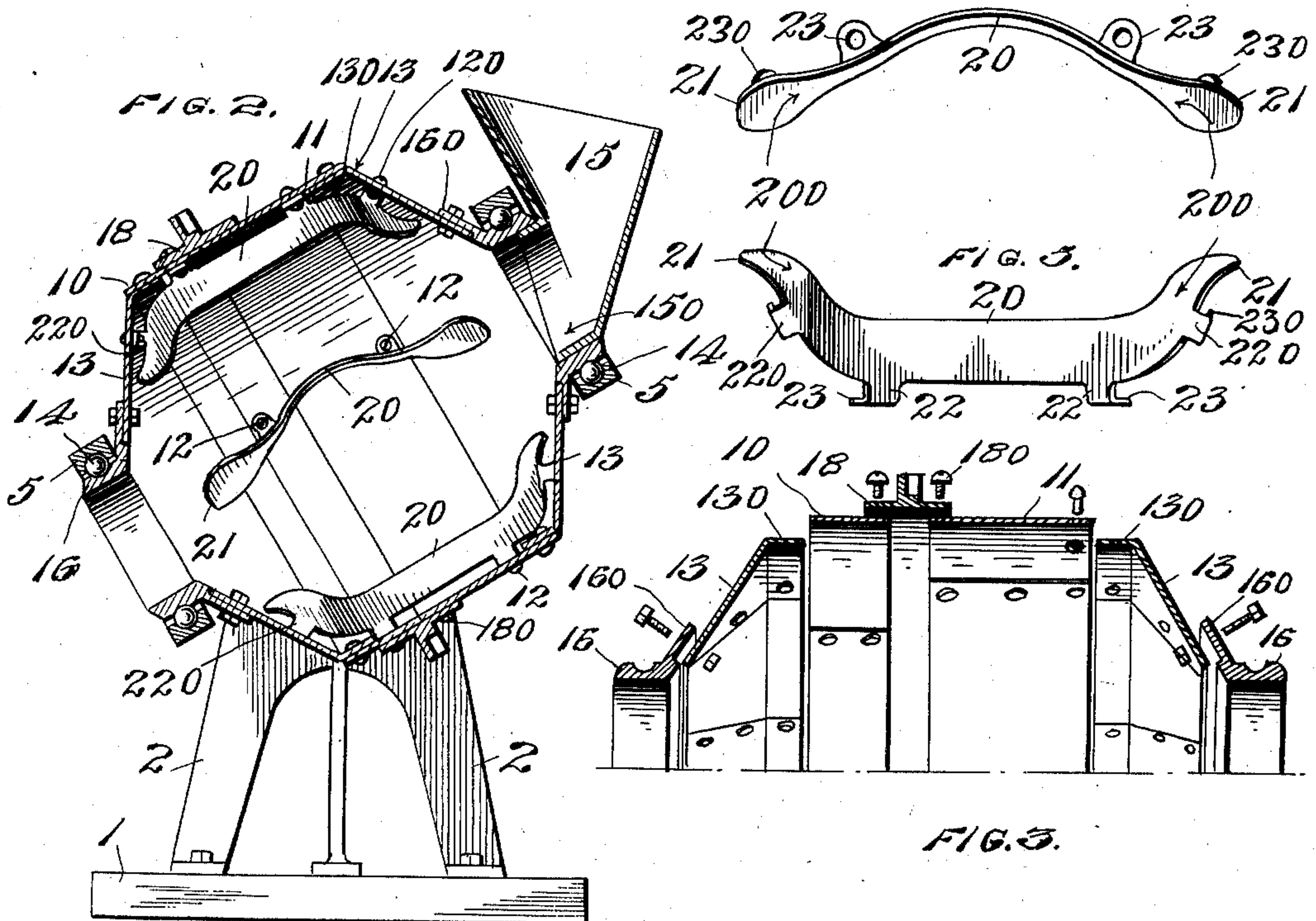


FIG. 4.



WITNESSES:

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INVENTOR:

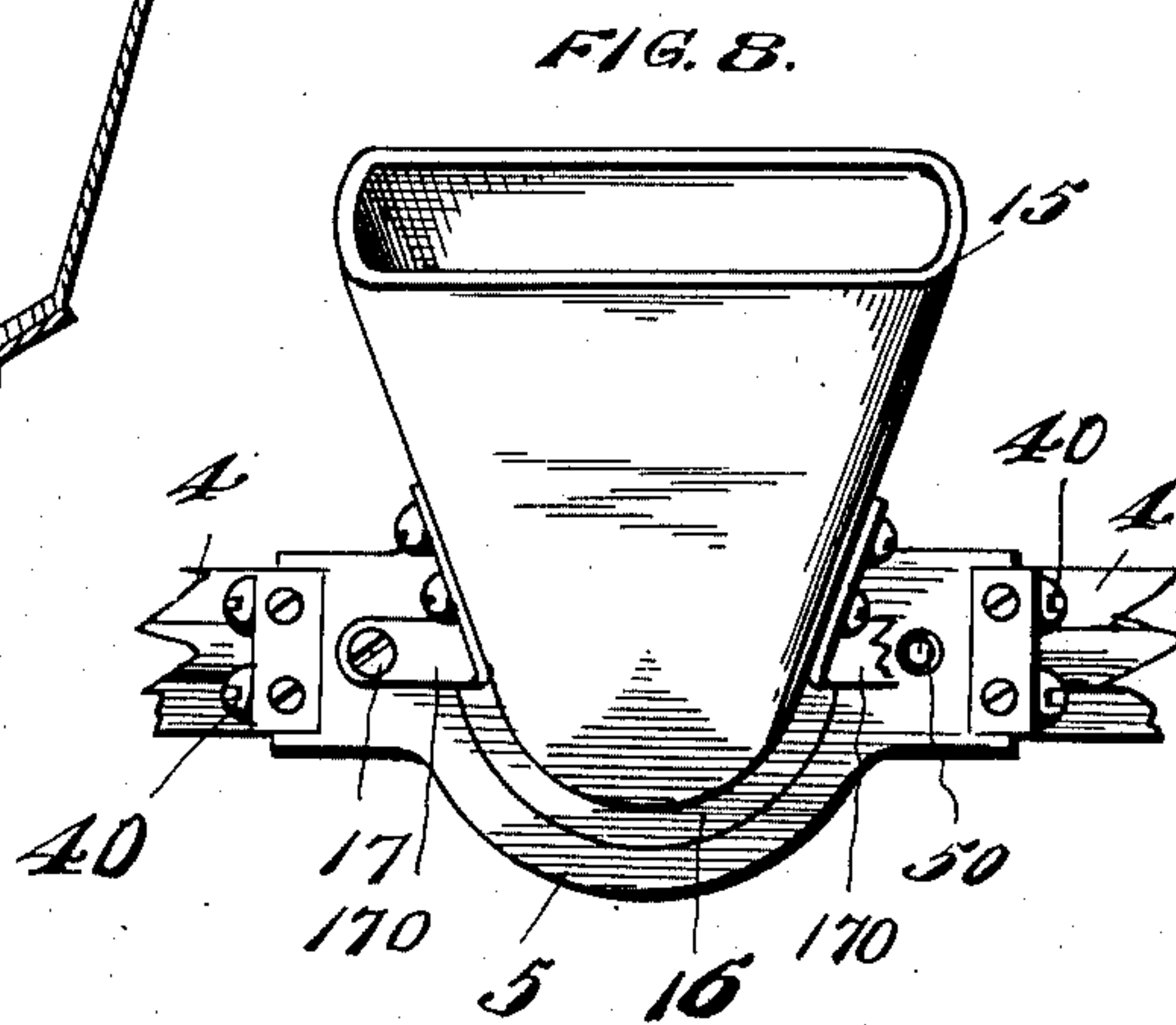
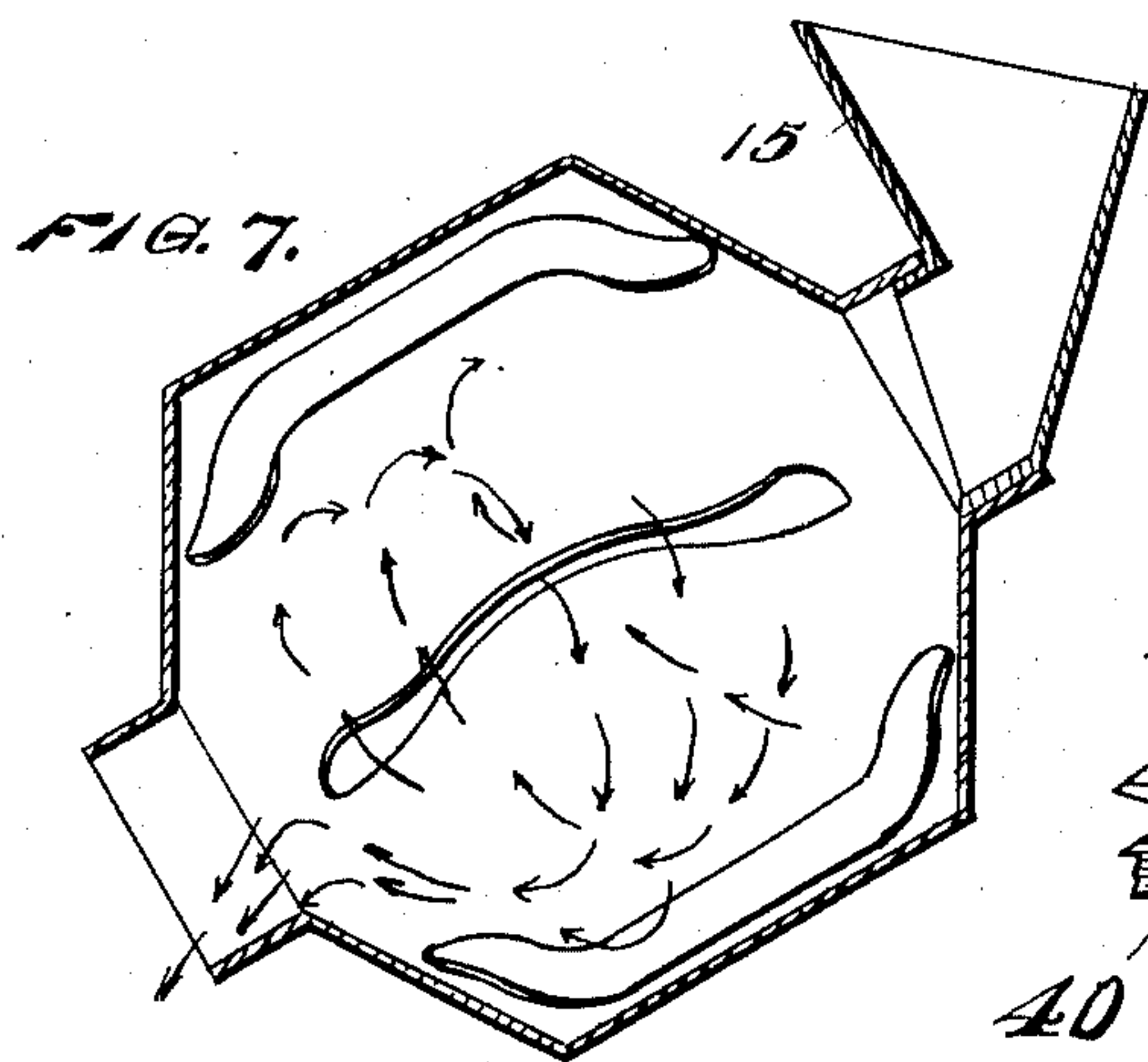
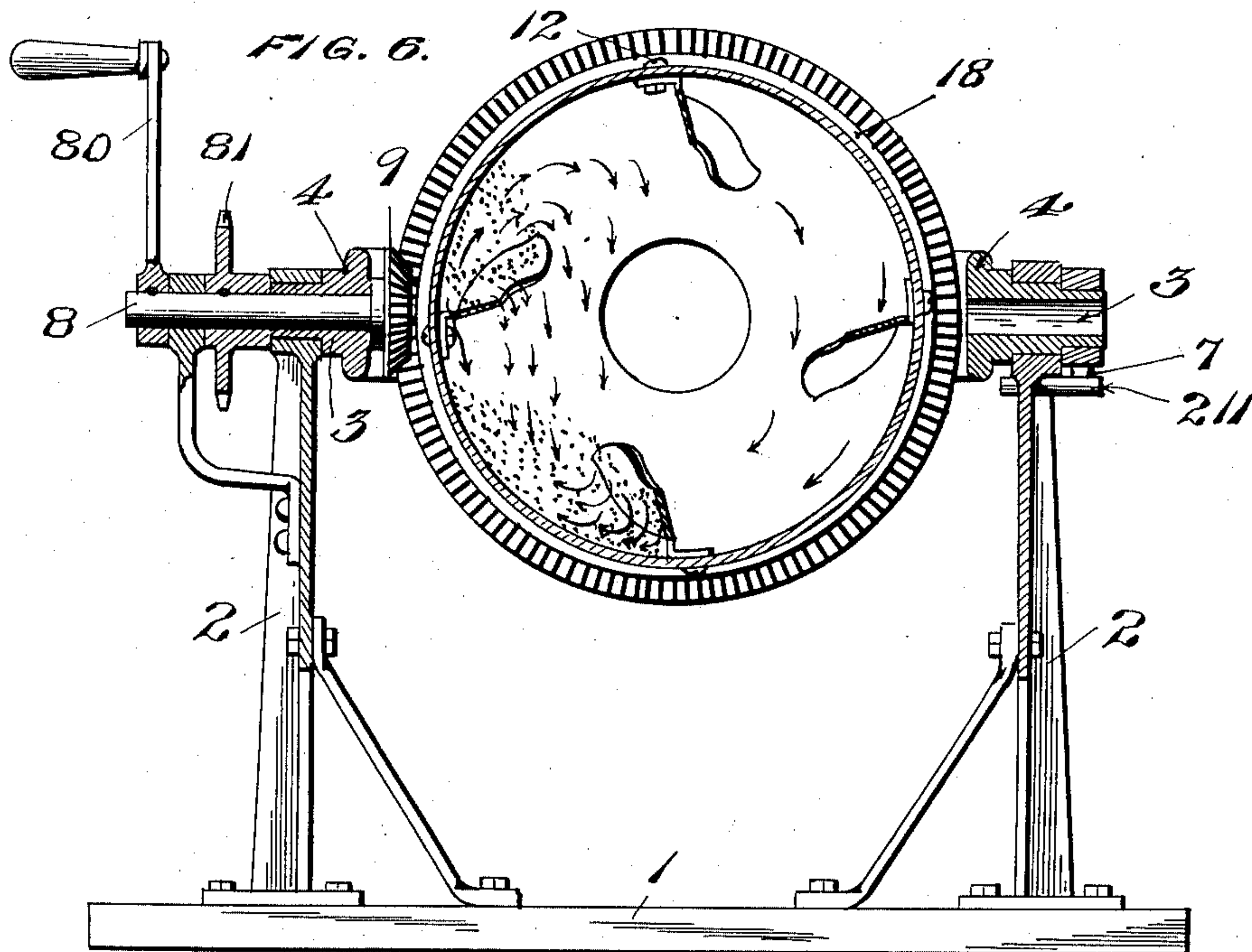
Evan B. Ravencroft,
by
Collamer & Co., Attorneys.

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UNITED STATES PATENT OFFICE.

EVAN B. RAVENCROFT, OF MISHAWAKA, INDIANA.

CONCRETE-MIXER.

No. 907,284.

Specification of Letters Patent.

Patented Dec. 22, 1908.

Application filed June 5, 1908. Serial No. 437,037.

To all whom it may concern:

Be it known that I, EVAN B. RAVENCROFT, a citizen of the United States, and resident of Mishawaka, St. Joseph county, State of Indiana, have invented certain new and useful Improvements in Concrete-Mixers; and my preferred manner of carrying out the invention is set forth in the following full, clear, and exact description, terminating with claims particularly specifying the novelty.

This invention relates to mills, and more especially to mortar mixers; and the object of the same is to produce a mixer for concrete and the like capable of being readily filled and dumped, and of being taken apart as for repair.

The following specification sets forth the details of the present invention, as shown in the drawings wherein—

Figure 1 is a perspective view of the mixer in the position it generally assumes when in use, showing in detail the stop pins whose use permits the turning of the frame through one half a circle and whose removal permits its turning through a full circle. Fig. 2 is a central vertical section through the mixer showing it tilted on its trunnions to a position where the axis of the drum is oblique and the entire machine is balanced. Fig. 3 shows details of the parts of the drum slightly separated from each other, showing their preferred manner of formation. Fig. 4 is a plan view and Fig. 5 a front elevation of one of the deflectors. Fig. 6 is a sectional view showing the tumbling of the material which takes place when the body rotates on a horizontal axis and Fig. 7 is a diagrammatic view showing the spiral agitation of the material by the deflectors when the body rotates on an oblique axis. Fig. 8 is an elevation of the inlet end of the mixer, showing the hopper detached and with one of its bearings broken away.

Referring to the drawings, the numeral 1 designates the base from which rises a pair of supports or legs 2 in which are journaled the trunnions 3 of a frame 4—here shown as comprising two like members having their centers parallel and their ends bent obliquely inward, and the extremities of the latter are connected by ball races 5 which are attached to the extremities by screws and are preferably made interchangeable so that any one will fit in the place of another on any machine of the same size. To the outer end of

one trunnion is secured a light handle 7 preferably standing in line with the frame 4, and adapted to rest in horizontal position on stop pins 211 which are removably inserted in one of the legs 2 as shown in Fig. 1, and it is obvious that by moving this handle through one half a circle so that it will rest on the other pin illustrated in this view the entire framework will be turned from the position indicated, to and through a position where its hopper will be elevated and its exit depressed so that dumping will occur, and finally to a position reversed from that shown. Through the other trunnion (which is tubular) projects a power shaft 8 driven from any suitable source as a crank handle 80 or a sprocket wheel 81 (to be connected with a source of power, not shown), and this shaft has a bevel gear 9 fast on its inner end just within the adjacent member of the frame 4.

The mixing chamber proper is composed of a double conical drum comprising two cylindrical members 10 and 11 and two like cones 13. The former preferably differ in width but are similar in construction, and as shown in Fig. 3 each preferably comprises a band bent into cylindrical shape with its ends lapping and riveted together. The same view also shows how each cone 13 is preferably made of two (or it might be four) sheet steel pieces having their ends lapping and riveted together. The larger end of each cone is deflected inward into a cylindrical flange 130, which fits inside the end of the adjacent cylinder and is riveted thereto as shown. The smaller end of each cone has an opening preferably about eighteen inches in diameter so that a boy or a small man can crawl through into the completed drum and perform work within it. Next outside the smaller end of each cone is located a neck 16 having an internal diameter of about thirteen inches, from which projects a flange 160 adapted to fit outside the truncated end of the cone, to which it is bolted so as to render it removable, and by preference said neck forms the inner member of the ball race 5. The numeral 15 designates a hopper preferably having a curved and funnel shaped body whose smaller end projects loosely into said neck and is held therein by screws 17 taking through ears 170 and interchangeably engaging screw-threaded holes 50 in the fixed ball race 5, a series of balls 14 being interposed between the race 5 and neck 16 as will be understood. From this

description it will be clear that by removing the screws 17 the funnel may be reversed, and that it can be applied to the neck at either end of the machine although it is preferably attached on that end toward which the handle 7 projects, as shown, and that end of the body becomes the inlet and the other the outlet. The ball races are preferably connected with the frame by screws 40, and when these are withdrawn it will be clear that the entire body with both ball races and the hopper can be removed from the frame. It will also be clear that by removing the bolts, either neck 16 and its flange can be disconnected from its cone 13, so that a man could enter the body and perform work therein.

The inner extremities of the cylindrical members 10 and 11 preferably abut as shown in Fig. 2, and over them is slipped a gear ring 18 whose toothed portion is in constant mesh with the power gear 9 and whose cylindrical portion is connected with the ends of the members 10 and 11 by screws 180—thereby holding them alined and connected but permitting their disconnection when desired. As above stated, the inner member 11 is preferably a little deeper than the other member 10 so that in covering the meeting line between them the gear ring stands to one side of a line through the trunnions. This construction is purposely adopted to put the weight of said ring to that side of a line through the trunnions which is opposite to the direction in which the handle 7 projects and the neck to which the hopper 15 is attached—thereby producing a perfect balance of the entire machine on its trunnions so that a child could rock it or it will stand at rest in any inclined position to which it is set. This I consider an important detail of construction, in view of the fact that a machine adapted to handle about fourteen cubic feet of material weighs in the neighborhood of 3,500 pounds which is the weight upon the trunnions. If it should so happen that the power applied to the sprocket wheel 81 leads from such a direction that it is not convenient to attach the hopper where shown, it can be reversed in the manner set forth above so as to have the inlet and outlet at the relatively opposite ends of the body from the showing herein, and the removability of the pins 211 is therefore of use in permitting the entire rotation of the body on its trunnions without the necessity for disconnecting the handle.

It will be obvious that power applied to the crank handle or sprocket will rotate the shaft 8 and gear 9, and the latter by meshing with the gear ring 18 will cause the drum to turn on its axis which is a line drawn through the centers of said ball races, and it will also be obvious that when this axis stands horizontal the material to be treated can be fed into the hopper and will be mixed, but when the frame is tilted on its trunnions so that the

axis stands oblique the material will be dumped out of the exit into a suitable receptacle.

In connection with the above machine, I preferably employ an agitator consisting of a series of deflectors best seen in Figs. 4 and 5. As here illustrated, each deflector has a body 20 which is straight across its upper and lower edges but bent back to the rear, and curved in plan view so that its dish side or mouth stands forward, at both ends of the body are ends 200 whose upper and lower edges rise obliquely from those of the body and the bodies of these ends in plan view extend on straight lines continuing the tangents of the arc through which the body is curved, and the outer extremities 21 of the ends are deflected slightly outward on a straight line with each other and which would be on a chord of said arc in plan view and are tipped backward at their upper corners. From the lower edge of the body depend two feet 22 which are bent to the rear as at 23 and are adapted to be engaged by screws 12 taking through the cylindrical portion of the drum; and from the ends 200 depend two other feet 220 also bent to the rear as at 230 and adapted to be engaged by screws 120 taking through the conical portions of the drum. Thus it will be seen that there are four points of attachment between each deflector and the drum, and as there are two on either side of the line between the meeting edges of the members 10 and 11 the screws 12 and 120 assist in holding said members together. The feet 22 and 220 are of sufficient length to hold the lower edges of the body and ends slightly above the interior walls of the cylindrical and conical members so as to leave a space through which the liquid in the mixture and some of the finest portions of the latter may pass.

As seen in Fig. 6, when the drum rotates on a horizontal axis, the material is collected from the cones by the ends 200 which converge toward the body 20, and banks up against the latter where it accumulates until it tumbles over its rearwardly deflected center.

As seen in Fig. 7, where the drum rotates on an oblique axis, the bulk of the material being agitated is caught and handled by one of the ends 200, while the body 20 catches some of it and holds it from said end, and the other end 200 in the then higher cone is performing little or no service—hence the result is that the material is banked up and dumped over the deflector at a point between the body and its lowermost end, and agitation of a spiral character is produced and said lower end draws the material away from the exit through the adjacent open end of the drum until the latter is tilted so far that the material in its spiral agitation tumbles past the lowermost extremity 21 and drops out

the exit. In any event, however, the water and finer particles which pass under the deflector constantly scour the inner wall of the drum and keep it cleaned and free of rust.

5 Obviously the precise shape of the bends in the deflector body and its extremities is immaterial, but I consider it desirable that the mouths of all the deflectors shall be presented in the same direction circumferentially around the interior of the drum.

10 The use of a machine of this character need hardly be explained in detail, since it is well known to those skilled in the art. The material to be mixed is dumped into the hopper 15 whence it flows through the adjacent neck 16 and falls into the interior of the drum, the rotation of the latter produces mixing by means of the agitator whether the drum stands on a horizontal or an oblique axis, 20 and after the material has been thoroughly mixed the drum is tilted on its trunnions so as to dump the mixed material out of the exit into a suitable receptacle.

25 All parts are of the desired sizes and proportions, and are preferably of metal to prevent rust.

Such changes in specific details may be adopted as do not depart from the gist of the invention set forth in the claims below.

30 What is claimed as new is:

1. In a mixer of the character described, the combination with a drum having reduced ends with tubular necks at their axial extremities, a tilting frame including ball-races with balls surrounding said necks, said 35 races being interchangeable at opposite ends of the frame and each having screw-threaded holes, and means for rotating the drum on its axis; of a hopper having a funnel-shaped 40 body and a reduced end extending loosely into one of said necks, ears projecting radially from the funnel, and screws taking through said ears into certain of said screw-threaded holes and holding the funnel interchangeably 45 on either race.

2. In a mixer of the character described, the combination with a tilting frame mounted on trunnions, and a power gear; of a drum having a cylindrical body portion made in 50 two members of different widths and having reduced ends, bearings in the frame for said ends, a hopper carried by the bearing which is remote from the meeting line between said members, a gear ring lapping said meeting 55 line to balance the machine on its trunnions and with its teeth engaging the power gear, and connections between said ring and both members.

3. In a mixer of the character described, the combination with a tilting frame mounted on trunnions, a handle projecting from one of them, and a power gear; of a drum having a cylindrical body portion made in two members of different widths and having reduced 60 ends, bearings in the frame for said ends, a

hopper carried by the bearing which is remote from the meeting line between said members and at that end of the drum toward which the handle projects, a gear ring lapping said meeting line to balance the hopper and 70 handle and with its teeth engaging the power gear, and screws between said ring and both members.

4. In a mixer of the character described, a drum comprising a cylindrical body portion 75 made in two members with their adjacent ends alined and connected, two conical ends each having a flange at its larger extremity riveted to the outer end of one of said members and an opening at its smaller extremity, 80 and two tubular necks each having a flange fitting the smaller end of one of the cones and removably bolted thereto; combined with a tilting frame having ring bearings in which said necks are journaled, and means for rotating 85 the drum on its bearings.

5. In a mixer of the character described, the combination with a rotating drum; of an agitator therein consisting of a series of deflectors each having a curved body with its 90 mouth toward the front in the direction of rotation of the drum, diverging ends projecting tangentially from the arc in which the body is struck, and rearwardly deflected outer extremities. 95

6. In a mixer of the character described, the combination with a rotating drum; of an agitator therein consisting of a series of deflectors each having a curved body with its 100 mouth toward the front in the direction of rotation of the drum, the inner edge of the body being deflected to the rear of a radius in said direction, diverging ends projecting tangentially from the arc in which the body is struck, and rearwardly deflected outer 105 extremities standing in line with each other on a chord through said arc.

7. In a mixer of the character described, the combination with a drum having a cylindrical body portion and reduced ends, and 110 means for rotating it on its axis; of an agitator consisting of a series of deflectors each having a body secured within the body portion of the drum with its inner edge deflected to the rear of a radius in the direction of rotation, and forwardly projecting ends secured 115 within the reduced portions of said drum.

8. In a mixer of the character described, the combination with a drum comprising a cylindrical body portion and conical ends, 120 and means for rotating it on its axis; of an agitator consisting of a series of deflectors each comprising a body with its lower edge parallel with the cylindrical portion and ends with their lower edges parallel with the conical portions of the drum, feet depending from the body and ends and holding them spaced 125 from the interior of the drum, and means for connecting the feet with the drum.

9. In a mixer of the character described, 130

the combination with a drum comprising a cylindrical body portion and conical ends, and means for rotating it on its axis; of an agitator consisting of a series of deflectors
5 each comprising a body with its lower edge parallel with the cylindrical portion and ends with their lower edges parallel with the conical portions of the drum, the body being curved to the rear in the direction of rotation
n and the ends extending obliquely forward from the body in said direction, feet depending from the body and ends and holding them

spaced from the interior of the drum, the feet being bent to the rear, and screws taking through said rearward bends and holding the
15 deflectors detachably within the drum.

In testimony whereof I have hereunto subscribed my signature this the 20th day of May, A. D. 1908.

EVAN B. RAVENCROFT.

Witnesses:

NEWTON L. COLLAMER,
EDITH L. SMITH.